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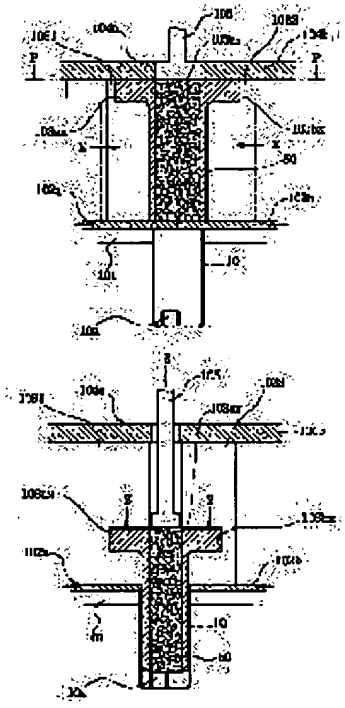
(54) MANUFACTURE OF LIQUID HOLDING CONTAINER AND DEVICE FOR MANUFACTURING THEREOF

(57)Abstract:

PURPOSE: To reduce the quantity of liquid remaining in a container by compressing a plurality of elastic porous bodies, and by charging these porous bodies in the container so that the porous bodies are adjacent to only another porous member in the center part of the container in order to obtain a homogenous or desired compressive distribution.

CONSTITUTION: Movable walls 103bx, 103ax are moved in a direction indicated by the arrow X so as to allow the longitudinal compression of a liquid preserving container, so as to complete the compression for flake porous bodies. Further, a piston 105 is also moved in a direction indicated by the arrow Z together with movable walls 103ax, 103bx, 103ay which form a charge guide. After the charge guide is inserted into the liquid reserving container, the piston 105 is moved in the direction of the arrow Z so as to compress the flake porous bodies which are therefore



compressed in three directions, horizontally and vertically, within the container before the compression step is completed. Thereafter, the charge guide is moved upward while the piston 10 is retained as it is, and accordingly, the charging of the frame porous bodies are completed.

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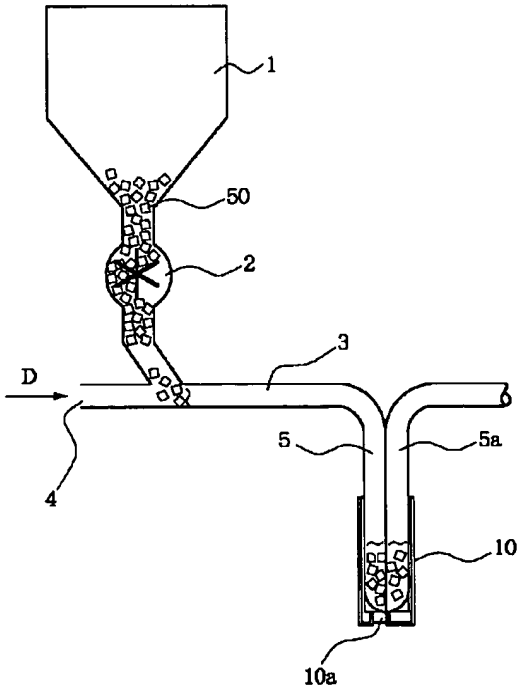
(54)【発明の名称】　液体保持容器の製造方法、及び製造装置

(57)【要約】

【目的】　液体を収納する液体保持容器内に配される多孔質体が、所望の圧縮分布をなすように充填することにより、外部に導出できない容器内に残留する液体量を少なくすることを目的とする。また、表面張力の異なる液体を収納する容器や、容積等の形状の異なる容器を用いる場合にも、同一種の弾性多孔質体を適応可能とすることを目的とする。

【構成】　容器内に弾性多孔質体の充填部を有する液体保持容器の製造方法において、複数の前記弾性多孔質体を圧縮する圧縮工程と、前記多孔質体を容器内の中央部では他の多孔質体とのみ隣接するように容器内に充填する充填工程を有する。



【特許請求の範囲】

【請求項１】　容器内に弾性多孔質体の充填部を有する液体保持容器の製造方法において、
複数の前記弾性多孔質体を圧縮する圧縮工程と、
前記多孔質体を容器内の中央部では他の多孔質体とのみ隣接するように容器内に装填する装填工程を有することを特徴とする液体保持容器の製造方法。

【請求項２】　前記弾性多孔質体の装填工程は、前記弾性多孔質体を所望量容器内に装填する工程であり、
前記圧縮工程は、該装填工程終了後前記弾性多孔質体を圧縮する工程であって、前記装填工程と前記圧縮工程とが順次繰り返されることを特徴とする請求項１に記載の液体保持容器の製造方法。

【請求項３】　前記装填工程は、弾性多孔質体供給手段により前記容器に供給される工程であって、該弾性多孔質体供給手段は複数設けられていることを特徴とする請求項１乃至２に記載の液体保持容器の製造方法。

【請求項４】　前記圧縮工程は、弾性多孔質体圧縮手段として前記多孔質供給手段を用いる工程であることを特徴とする請求項２乃至３に記載の液体保持容器の製造方法。

【請求項５】　前記圧縮工程における前記弾性多孔質体の圧縮量が異なることを特徴とする請求項２に記載の液体保持容器の製造方法。

【請求項６】　前記圧縮工程の後に、前記装填工程を行うことを特徴とする請求項１に記載の液体保持容器の製造方法。

【請求項７】　容器内に弾性多孔質体の充填部を有する液体保持容器の製造方法において、
前記弾性多孔質体を容器内に装填する装填工程と、
前記弾性多孔質体を圧縮する圧縮工程とを有し、
前記圧縮工程と装填工程の間に、前記弾性多孔質体の圧縮緩和工程を有していることを特徴とする液体保持容器の製造方法。

【請求項８】　前記圧縮緩和工程は、前記多孔質体の前記容器への供給量制御手段により行われることを特徴とする請求項７に記載の液体保持容器の製造方法。

【請求項９】　前記圧縮緩和工程は、前記多孔質体への液体供給工程を有することを特徴とする請求項７に記載の液体保持容器の製造方法。

【請求項１０】　前記圧縮工程と前記圧縮緩和工程は複数回繰り返されることを特徴とする請求項９に記載の液体保持容器の製造方法。

【請求項１１】　前記装填工程は、弾性多孔質体供給手段により前記容器に供給される工程であって、該弾性多孔質体供給手段は前記弾性多孔質体を前記容器内部に装填するための開口部を有し、該開口部の移動速度を制御することにより容器内部の弾性多孔質体の圧縮率を制御することを特徴とする請求項６に記載の液体保持容器の製造方法。

【請求項１２】　容器内に弾性多孔質体を有する液体保持容器の製造方法において、
前記弾性多孔質体を一定量容器内に装填する装填工程と、
前記弾性多孔質体を圧縮する圧縮工程とを有し、
前記装填工程と前記圧縮工程とが順次繰り返されることを特徴とする液体保持容器の製造方法。

【請求項１３】　容器内に弾性多孔質体の充填部を有する液体保持容器の製造方法において、
前記弾性多孔質体を容器内に装填する装填工程と、
前記弾性多孔質体を圧縮する圧縮工程とを有し、
前記装填工程は、液体が含浸した前記弾性多孔質体を装填する工程と、液体が含浸していない前記弾性多孔質体を装填する工程とからなることを特徴とする液体保持容器の製造方法。

【請求項１４】　容器内に弾性多孔質体の充填部を有する液体保持容器の製造方法において、
複数の前記弾性多孔質体を、前記弾性多孔質体を貯留する貯留部から前記容器へ配管を介して搬送する搬送工程と前記多孔質体を容器内の中央部では他の多孔質体とのみ隣接するように容器内に装填する装填工程と、を有し、
前記搬送工程は、前記容器及び前記配管を減圧して搬送する工程であることを特徴とする液体保持容器の製造方法。

【請求項１５】　容器内に弾性多孔質体の充填部を有する液体保持容器の製造装置において、
複数の前記弾性多孔質体を貯留する貯留部と、
複数の前記弾性多孔質体を圧縮する圧縮手段と、
前記多孔質体を容器内の中央部では他の多孔質体とのみ隣接するように容器内に装填する装填手段を有することを特徴とする液体保持容器の製造装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、液体を内部に貯留するための液体保持容器の製造方法及び製造装置に関し、特にインクを吐出して記録を行なうインクジェット記録装置に用いられるインク貯蔵容器の製造方法及び製造装置に関する。

【０００２】

【従来の技術】従来、インクジェット記録装置に用いられるインクを貯蔵するためのインク貯蔵容器は、特開昭６３－８７２４２号公報、実開平５－６９２号公報等に開示されているように、液体保持用高分子弾性多孔質体としてインク貯蔵容器等のインク収容部の容積にほぼ等しい単体のインク貯蔵用の発泡材を内部に配する構成を採用していた。

【０００３】これらの弾性多孔質体は、例えば特開平５－３８８１６号公報に開示されているように、空孔量と圧縮率が適切に設定されることにより、安定したインク

供給を可能とする。従って、弾性多孔質体を容器内に充填する場合には細心の注意が必要となる。

【０００４】そのための弾性多孔質体のインク貯蔵容器への充填方法としては、特開平４－３５７０４６号公報に開示されている治具により所望の大きさまで力を加えて圧縮した後、別のピストンで挿入する方法、特開平５－４６３号公報に開示されているウレタンフォームをガイドに沿って圧縮後移動し充填する方法などがある。

【０００５】しかし、上述の充填方法は単体の多孔質体を、容器に挿入する場合には有効であるが、例えば、特開昭６０－２４５５６２号公報、特開平２－３４３５３号公報等に開示されている単体の多孔質体からインク収納部を形成しない構成の場合には、複数の多孔質体の圧縮状態を均質に保ってインク貯蔵部に収納することは難しい。

【０００６】また、インク貯蔵部に収容されたインクの使用効率を向上させるために、インク吐出部へインクを供給するためにインク供給口部をインク容器内部に突出させ、多孔質体の一部を変形させる構成とした場合には、インク供給口近傍で多孔質体が変形させられるために、特に多孔質体と容器の内壁が接触する周辺部等で、所望の圧力勾配を設けることも困難である。

【０００７】さらに、設計上Ｌ字形や階段状等の複雑な形状にしなければならない容器に対して、その形状に相似な多孔質体を挿入しても、隙間なく圧縮率等を均一に充填する事が容易ではなく、インクの使用効率が低下したり、容器内に無駄な空間が生じていた。

【０００８】そして、表面張力の異なるインクを収容する容器や貯蔵室容積の異なる容器に充填される場合には、容器にあわせて空孔率や形状の異なる弾性多孔質体を複数用意する必要があった。

【０００９】

【発明が解決しようとしている課題】本発明は、液体を収納する液体保持容器内に配される多孔質体が、所望の圧縮分布をなすように充填されず、外部に導出できない容器内に残留する液体量が増加することを課題としている。

【００１０】また、本発明は、容器の内部形状に起因する容器内の多孔質体が配されていない空間に液体が溜まり、容器外部に液体が漏れてしまう可能性があることを課題としている。

【００１１】さらに、本発明は、表面張力の異なる液体を収納する容器や、容積等の形状の異なる容器を用いる場合に、空孔率や形状の異なる弾性多孔質体を用意する必要があることを課題としている。

【００１２】

【課題を解決するための手段】本発明は、上記課題を解決するための手段として、容器内に弾性多孔質体の充填部を有する液体保持容器の製造方法において、複数の弾性多孔質体を圧縮する圧縮工程と、多孔質体を容器内の中央部では他の多孔質体とのみ隣接するように容器内に装填する装填工程を有することを特徴とする液体保持容器の製造方法を提供するものである。

【００１３】さらに、前記弾性多孔質体の装填工程を弾性多孔質体を一定量容器内に装填する工程とし、圧縮工程を装填工程終了後弾性多孔質体を圧縮する工程とした上で、装填工程と圧縮工程とが順次繰り返す製造方法とするか、もしくは、前記圧縮工程の後に、前記装填工程を行う製造方法とすることにより、より確実に上記課題を解決する液体保持容器の製造方法を提供するものである。

【００１４】また、複数の弾性多孔質体を圧縮する圧縮工程と装填工程の間に、弾性多孔質体の圧縮緩和工程を設け、この圧縮緩和工程に前記多孔質体への液体供給工程を有する液体保持容器の製造方法を提供するものである。

【００１５】そして、容器内に弾性多孔質体を有する液体保持容器の製造方法において、前記弾性多孔質体を一定量容器内に装填する装填工程と、前記弾性多孔質体を圧縮する圧縮工程とを有し、前記装填工程と前記圧縮工程とが順次繰り返されることを特徴とする液体保持容器の製造方法を提供するものである。

【００１６】加えて、容器内に弾性多孔質体の充填部を有する液体保持容器の製造装置において、複数の前記弾性多孔質体を貯留する貯留部と、複数の前記弾性多孔質体を圧縮する圧縮手段と、前記多孔質体を容器内の中央部では他の多孔質体とのみ隣接するように容器内に装填する装填手段を有することを特徴とする液体保持容器の製造装置を提供するものである。

【００１７】

【作用】上記方法を採用することにより、液体保持容器内部の弾性多孔質体の圧縮率を、液体保持容器全体にわたって使用目的に適応した分布状態とすることが可能である。

【００１８】そして、任意の形状の容器に弾性多孔質体を充填することができる。

【００１９】また、液体保持容器内部への弾性多孔質体の圧縮装填が完了したときに液体の注入を完了させることができる。

【００２０】

【実施例】本発明の液体保持容器の製造方法を用いて、多孔質体を充填される容器を図１及び図２に示す。図１において１０は液体保持容器、８は液体保持容器内部に収納された液体を外部へ導出するための液体導出口である。

【００２１】ここで、１０ａは液体保持容器内部に貯留された液体が外部に導出されるのを促進する液体誘導体であり、９は液体誘導体１０ａを保持するための液体誘導体保持壁である。また、図２は図１における保持容器を底部側（矢印Ａ方向）から見たものである。

【００２２】なお、本発明が適応される容器は、図１及び図２に示される形態に限られるものではなく、液体誘導部材１０ａを用いずに図１中の液体誘導体保持壁の液体容器内部先端にフィルターを設けた形状であっても良いし、図２に示したように断面形状が直方体である必要性もない。

【００２３】図１及び図２に示した液体保持容器に本発明を用いて、例えばインクジェット記録装置に用いられるインクタンク等として製造された液体保持容器を図３に示す。図３において、１１は液体保持容器の多孔質体挿入用の開口を塞ぐ蓋であり、１１ａは蓋１１に設けられた液体保持容器内部と外部とを連通させる大気連通口である。

【００２４】そして、５０は高分子弾性多孔質体であり、液体保持容器の内容積に比して小さく成形される。この多孔質体５０は、液体保持容器内に複数設けられ、容器内中央部等に配される多孔質体は他の多孔質体にのみ隣接し、液体保持容器の内壁近傍に配された多孔質体は、他の多孔質体と前記液体保持容器の内壁の双方に隣接する。

【００２５】この多孔質体５０の大きさ及び形状は、インク容器内部の全内壁間において複数装填することが可能であれば良い。従って、直方体や球形などに限るものではなく、また、複数の多孔質体すべての大きさや形状が等しくなくても良い。以下、多孔質体５０を本発明においてフレーク多孔質体と称する。

【００２６】上述したように、本発明では液体を保持するための多孔質体として、容器のほぼ全体を占める大きさを有する単体の多孔質体ではなく、フレーク多孔質体を用いるが、このフレーク多孔質体は液体保持容器内に装填された場合において、複数の多孔質体が相互に圧縮され隣接した状態となるように装填される。

【００２７】なお、本発明を用いた液体保持容器を、例えばインクジェット記録装置等に装着し、インクを確実にインクジェット記録装置に安定した供給を行う等の必要性がある場合には、ある程度フレーク多孔質体５０の大きさ、形状をそろえるほうが好ましい。

【００２８】以下、上述の液体保持容器を製造するために用いられる本発明を図面に基づき詳細に説明する。各実施例では、フレーク多孔質体の大きさを５㎜角とした。

【００２９】（第１実施例）本発明の液体保持容器の製造方法の第１実施例を図４から図６に示す。図４（ａ）及び（ｂ）は、液体保持容器内に装填されるフレーク多孔質体５０をフレーク多孔質体充填装置に供給する工程を示している。図４（ａ）はフレーク多孔質体の充填装置の断面概略図であり、図４（ｂ）は、図４（ａ）におけるＰ－Ｐ断面図概略図である。そして、図５及び図６はフレーク多孔質体の圧縮工程及び液体保持容器への装填工程を示している。

【００３０】図４において、１０１はフレーク多孔質体充填装置に液体保持部材１０装着するための装着ガイドであり、１０２ａ、１０２ｂは可動板である。１０３、１０３４、１０３ｂｘ、１０３７、１０３８、１０３ａｘは、図４（ｂ）に示される液体保持容器の断面における長手方向にフレーク多孔質体を圧縮するための可動壁である。

【００３１】また、前述の長手方向と直交する方向にフレーク多孔質体を圧縮するための可動壁が１０３ａｙと１０３ｂｙである。１０３１、１０３２、１０３５、１０３６は固定壁であり、前述の２方向の可動壁が移動する際のガイドにもなる。

【００３２】本実施例においては、前述の長手方向に圧縮後、それと直交する方向に圧縮するが、この工程順序に限るものではなく、前述の固定壁を可動壁として、１０３３、１０３４、１０３７、１０３８を固定壁として、圧縮方向の順序を入れ替えても良い。

【００３３】そして、図４（ａ）において、１０４ａ、１０４ｂは可動蓋であり、１０５は図中の液体保持容器の高さ方向にフレーク多孔質体を圧縮するためのピストンであり、前述の可動板１０２ａ、１０２ｂ、装着ガイド１０１、及び可動壁と固定壁とでフレーク多孔質体の圧縮室を形成する。ここで、フレーク多孔質体を充填装置に供給する場合は、可動蓋１０４ａまたは１０４ｂの一方もしくは双方を移動させる。供給するフレークの量は、液体保持容器に要求される容積、圧縮率もしくは毛細管力等により決定される。

【００３４】次に、圧縮工程及び装填工程を図５及び図６を用いて説明する。図５（ａ）は圧縮工程におけるフレーク多孔質体の充填装置の断面概略図であり、図５（ｂ）は、図５（ａ）におけるＰ－Ｐ断面図概略図である。図６（ａ）及び図６（ｂ）は、液体保持容器へのフレーク多孔質体の充填装置の断面概略図である。

【００３５】前述したように、図２における液体保持容器の長手方向に圧縮するために図５（ａ）に矢印Ｘで示した方向に可動壁１０３３（不図示）、１０３４（不図示）、１０３ｂｘ、１０３７（不図示）、１０３８（不図示）、１０３ａｘが移動する。その後、図５（ｂ）に矢印Ｙで示した方向に、すなわち図２における液体保持容器の断面の短径方向に可動壁１０３ａｙ及び１０３ｂｙが移動し、フレーク多孔質体の２方向の圧縮が完了する。

【００３６】このとき、１０３ａｘ、１０３ｂｘ、１０３ａｙ、１０３ｂｙにより液体保持容器内に圧縮されたフレーク多孔質体を装填するための装填ガイドを形成する。

【００３７】そして、図６（ａ）に矢印Ｚで示した方向に、前述の装填ガイドを形成する１０３ａｘ、１０３ｂｘ、１０３ａｙ、１０３ｂｙとともにピストン１０５も移動する。また、１０２ａ及び１０２ｂは、装填ガイド

が液体保持容器内に挿入可能なように移動する。このとき、フレーク多孔質体は１０３ａｘ、１０３ｂｘ、１０３ａｙ、１０３ｂｙを押圧するように互いに圧接しているため、液体保持容器１０内に落下することはない。

【００３８】装填ガイドが液体保持容器内に挿入された後、図６（ｂ）に示されたように、ピストン１０５のみ矢印Ｚ方向に移動しフレーク多孔質体を圧縮する。従って、液体保持容器内の水平及び垂直方向の３方向にフレーク多孔質体は圧縮され、圧縮工程が終了する。この後、ピストン１０５はそのままで、装填ガイドを図中上方向に移動させ、フレーク多孔質体の装填工程は終了する。

【００３９】以上の圧縮工程及び装填工程を終了した液体保持容器は、蓋１１を超音波溶着等で図３に示したように固定され、液体保持容器の製造工程が完了する。

【００４０】本実施例に示したように、複数のフレーク多孔質体を圧縮する圧縮工程と、フレーク多孔質体を容器内の中央部では他のフレーク多孔質体とのみ隣接するように容器内に装填する装填工程を有することを特徴とする液体保持容器の製造方法を用いることにより、液体保持容器の内部形状に関わらず容器内全体に多孔質体が充填される。

【００４１】さらに、充填されるフレーク多孔質体の量を変更するだけで、液体保持容器の容積変更や、圧縮率の変更に対応することができる。また、多孔質体の液体保持容器内部の圧縮状態に偏りが発生することもない。従って、液体保持容器内の多孔質体の圧縮率が局所的に高いことに起因するインク残留も改善することができる。

【００４２】そして、本実施例では、図１４に示した従来構成と同様に、液体導出口が設けられている液体導出部が容器内部に突出しているために、図６の装填時に液体導出部近傍の圧縮率の勾配をつけることが可能である。

【００４３】（第２実施例）本発明の液体保持容器の製造方法の第２実施例として、多孔質体の充填装置の断面概略図を図７に示す。

【００４４】図７において、１はフレーク多孔質体５０を収容するホッパーである。そして、２はフレーク多孔質体５０の逆流を防止し、定量供給するためのロータリーバルブであり、５及び５ａは液体保持容器本体１０の内部にフレーク多孔質体５０を挿入するための供給ノズルである。３は液体保持容器にフレーク多孔質体を搬送するための配管であり、この配管には搬送に用いられるエアーを配管３内に引き入れるためのエア導入口４が設けられている。

【００４５】ここで、フレーク多孔質体５０は、ホッパー１から、ロータリーバルブ２を通り、図７に示した矢印Ｄ方向に加圧されたエアーにより可撓性の配管３を経由して、供給ノズル５に搬送される。同様に、フレーク多孔質体５０が別のホッパー（不図示）から供給ノズル５ａに搬送される。供給ノズル５及び５ａは共に液体保持容器本体１０の内部に挿入されており、液体保持容器内に弾性多孔質体を装填する。

【００４６】このとき、フレーク多孔質体を確実に液体保持容器に挿入するために、液体保持容器内を任意の手段で減圧もしくは真空状態にしておくと、より好ましい。

【００４７】フレーク多孔質体の搬送方法としては、上記以外に、液体保持容器本体のみを真空もしくは減圧状態にしてフレーク多孔質体を搬送する方法が挙げられる。また、液体保持容器と弾性多孔質体貯蔵部であるホッパー１からみて液体保持容器側の配管を真空もしくは減圧状態として、フレーク多孔質体を搬送する方法もある。このとき、減圧部は配管の複数箇所に設ける構成とし、液体保持容器に向かうにつれてより真空に近づくように減圧勾配を設けても良い。

【００４８】上述した搬送方法を用いた場合、単にエアーによる加圧搬送するのに比べ、液体保持容器を着脱する場合に供給ノズルからフレーク多孔質体が飛び出るのを防止できると共に、フレーク多孔質体の供給量をより確実に制御することができる。

【００４９】次に、図８及び図９を用いて、本実施例のフレーク多孔質体の挿入工程及び圧縮行程を有する製造工程を説明する。

【００５０】図８（ａ）は、図７に示されているように供給ノズル５、及び５ａが液体保持容器本体１０の内部に挿入された状態である。本実施例では、供給ノズルは、２本となっているが、何本でも良い。

【００５１】しかし、１本の場合には、供給ノズルからフレーク多孔質体５０が落下することなどにより所望の供給量以上にフレーク多孔質体が装填されないように、多孔質体の圧力バランスを考慮する必要がある。本実施例のように２本の場合には、通常は供給用の開口部５ｋが露出しないためフレーク多孔質体が落下することはなく、１本の場合よりも好ましい。

【００５２】液体保持容器内に供給ノズルが挿入された後、図８（ｂ）の様に、まず供給ノズル５ａを供給ノズル５の開口部５ｋが完全に露出するまで上昇させる。ここで、上昇させる駆動源は、エアーシリンダーでもモーター駆動のボールネジでも良いが、後述の動作を加味すると、モーター駆動のボールネジの方がよい。

【００５３】ここで、供給ノズル５からフレーク多孔質体５０は定量供給される。この場合のフレーク多孔質体の供給量の制御は、エアーの加圧圧力、及びロータリーバルブ２により行われ、その定量性を確保される。供給量に対して精度を要求される場合は、スクリュー式の押し出し機等を使用すると良い。

【００５４】次に、図８（ｃ）の様に、供給ノズル５ａを供給ノズル５の下端まで下降させる。これにより、フ

レーク多孔質体５０は圧縮されて、５０ｂの状態になる。ただし、この下降量が、フレーク多孔質体５０の圧縮率を決定するため、必ずしも双方の供給ノズルの下端が一致するとは限らない。一般にインクジェット記録装置での圧縮率は、インクの表面張力により異なるが、３～６倍に設定される。

【００５５】そして、今度は供給ノズル５の下側にフレーク多孔質体５０を充填するため、図８（ｄ）に示した様に、供給ノズル５を供給ノズル５ａの開口部が完全に露出するまで上昇させ、次に、供給ノズル５からフレーク多孔質体５０を定量供給する。

【００５６】その後、図９（ａ）に示すように、供給ノズル５をフレーク多孔質体５０が所望の圧縮率になるまで下降させる。

【００５７】次に、図８（ｂ）および図８（ｃ）の工程と同様に、図９（ｂ）及び図９（ｃ）に示すように、供給ノズル５ａを供給ノズル５の開口部５ｋが完全に露出するまで上昇させた後、供給ノズル５ａを供給ノズル５の下端まで下降させ、フレーク多孔質体を圧縮する。

【００５８】以下これらを繰り返し、最後に図９（ｄ）の状態にして、供給ノズル５、及び５ａを上昇させる。このようにフレーク多孔質体の挿入工程と圧縮行程とを反復させる形態を採るために、供給ノズルによる圧縮行程の後、挿入工程に移行する場合、供給ノズルの移動方向に平行に圧縮されたフレーク多孔質体５０ｂの復元力が働く。しかし、供給ノズルによる圧縮方向に直角をなす水平方向に隣接するフレーク多孔質体５０ｂにも作用するため、次の圧縮行程が始まる前にフレーク多孔質体が圧縮前の大きさにまで復元することはない。

【００５９】以上のようにフレーク多孔質体５０を液体保持容器本体１０に充填した後、図３に示したように、液体保持容器内部に空気を取り入れるための大気連通口１０１ａの設けられた蓋１０１を液体保持容器本体１０に超音波溶着等で固定されて液体保持容器の製造工程が完成する。

【００６０】ここで、大気連通口近傍の圧縮されたフレーク多孔質体５０ｂは供給ノズル挿入方向に働く復元力により、多少その圧縮率を低下させる可能性はあるが、液体導出口近傍の圧縮率より高くなることはないので、フレーク多孔質体の復元による液体供給効率への影響は少ない。一方、圧縮状態の緩和されたフレーク多孔質体はバッファ室的に働く場合もあり、大気連通口からの液体漏れの防止効果も望むことができる。

【００６１】本実施例においては、フレーク多孔質体の供給ノズルを２本とし、フレーク多孔質体供給手段としてだけでなく、フレーク多孔質体圧縮手段として使用しているため、容器内に挿入される構成を簡略化することができ、小型の液体保持容器に対しても好適に使用可能である。また、供給ノズルの挿入方向に直交する方向に対するフレーク多孔質体の押圧力も、１本の場合よりもより強くすることができ、圧縮率の適応範囲を広げることができる。

【００６２】本実施例を用いることにより、第１実施例と同様に、容器形状や圧縮率の変更に対してもフレーク多孔質体の供給量や供給ノズルによる圧縮量を制御するだけで柔軟に対応することができる。

【００６３】さらに、液体誘導体１０ａを備えた外部へ液体導出口近傍の多孔質体の圧縮率を高くして液体保持容器内のインクの使用効率を向上させるためには、供給ノズルによる圧縮量を液体導出口近傍で高く設定するだけで良く、第１実施例に比べ圧力分布の制御が簡単で正確である。

【００６４】また、通常の液体保持容器内の圧縮率も、挿入工程と圧縮行程とを繰り返す場合のフレーク多孔質体の供給量を制御することによりその精度を調整できるので、従来に比べ容器全体において多孔質体のより均質な圧縮分布を実現することができる。

【００６５】また、第１実施例と比較すると、フレーク多孔質体を装填してから圧縮する方法を採用しているので、液体保持容器の圧縮率の変更に対しより広範囲に対応することができる。

【００６６】（第３実施例）本発明の高分子液体保持容器の製造方法の第３実施例として、多孔質体充填装置の断面概略図を図１０に示す。図１０の（ａ）は充填初期を示し、図１０（ｂ）は充填終了時を示している。

【００６７】ここで１は、内部に送りスクリュー１４及び圧縮スクリュー１５を組み込んだホッパーであり、送りスクリュー１４及び圧縮スクリュー１５は外部のモーター１３の駆動軸１３ａと接続されている。ホッパー１に収容されたフレーク多孔質体５０は送りスクリュー１４で圧縮スクリュー１５が設けられた部分に送られる。

【００６８】そして、圧縮スクリュー１５で圧縮されたフレーク多孔質体５０ｂが圧縮される。この場合の圧縮率は、圧縮スクリュー１５から搬送経路（不図示）を介して液体保持容器本体１０に充填されたときに所望の圧縮率になるように、フレーク多孔質体の圧縮後の復元を考慮して決定される。

【００６９】ここで、送りスクリュー１４と圧縮スクリュー１５は、ピッチ及び外形が異なっている。圧縮スクリューは、筒径が一定で、スクリューの送りピッチが徐々に狭くなる構成や、筒径が徐々に小さくなるテーパ状の筒に、スクリューの送りピッチが一定の構成、もしくは前述の２つの構成を組み合わせたものが用いられる。

【００７０】また、１本の供給ノズルを使用しても、圧縮スクリューで圧縮後フレーク多孔質体が送られるので、搬送経路である配管の内壁を押圧する形で相互にフレーク多孔質体は圧縮しあうので、供給ノズルの開口部での落下は防止できる。

【００７１】ただし、フレーク多孔質体５０ｂの大きさと搬送速度の関係によっては落下する可能性があるの

で、本実施例では、圧縮スクリューから供給ノズル５ｂに至る経路中に、ロータリーバルブ２を取り付けて、確実に落下を防止している。ここで、ロータリーバルブ内のブレードを、バルブ内の壁面との間に空間を有するように設定する等の搬送圧力を伝達する構成とすることにより、フレーク多孔質体の圧縮量、搬送速度供給量を制御する。

【００７２】本実施例では、ロータリーバルブ２の前後において、フレーク多孔質体５０ｂはホッパー１側は圧縮スクリュー１５により数ｋｇ／ｃｍ2 に加圧されている状態であるのに対し、供給ノズル５ｂ側では基本的には大気圧でフレーク多孔質体５０ｂが落下しないように供給ノズル５ｂの内壁を押圧する程度にまで復元している。

【００７３】従って、このロータリーバルブ２を供給ノズルの近傍に配置することにより、搬送用の配管長が長い場合においてもフレーク多孔質体５０の供給量や圧縮率を制御することができる。

【００７４】次に、動作手順を説明する。まず、図１０（ａ）の様に、供給ノズル５ｂを液体保持容器本体１０に挿入した状態で、モーター１３、及びロータリーバルブ２を動作させ、供給ノズル５ｂから圧縮されたフレーク多孔質体５０ｂを液体保持容器内に押し出す。この時、押し出しながら供給ノズル５ｂを上昇させることにより、液体保持容器本体１０内に充填されたフレーク多孔質体５０ｂの圧縮率をほぼ均等にするように制御する。

【００７５】次に図１０（ｂ）の様に所望の充填量を充填したのち、モーター１３、及びロータリーバルブ２を止め、供給ノズル５ｂを上昇させる。以上で、フレーク多孔質体５０の充填が完了し、第２実施例と同様に、蓋を液体保持容器本体１０に超音波溶着等で固定されて液体保持容器が完成する。

【００７６】なお、本実施例では圧縮されたフレーク多孔質体５０ｂを押し出しながら供給ノズル５ｂを上昇させたが、液体保持容器本体１０の高さが低い場合等は、供給ノズル５ｂを移動させる必要はない。

【００７７】上述の製造方法を用いることにより、液体保持容器内部全体に多孔質体が装填でき、容器形状や所望の圧縮率に対応できる上に、第１及び第２実施例よりもより均質にフレーク多孔質体を装填することができる。

【００７８】第１実施例から第３実施例においては、液体保持容器が製造された段階では内部に液体は注入されていない。従って、図３に示した形態の液体保持容器に対してインク注入を行うことになる。この場合のインク注入方法としては、液体導出口８から容器内部の気体を吸引し、容器内部を真空状態もしくはそれに近い状態としてから、再び液体導出口８を介してインクを加圧注入する方法等が挙げられる。

【００７９】（第４実施例）本発明の液体保持容器の製造方法の第４実施例として、弾性多孔質体充填装置の概略断面図を図１１に示す。図１１（ａ）は充填初期を示し、図１１（ｂ）は充填終了時を示している。

【００８０】基本的な構成は、第３実施例とほぼ同様であるが、ロータリーバルブ２の途中に、液体配管２２が接続され、この液体配管２２にはロータリーバルブ２側から圧縮されたフレーク多孔質体５０ｂが流入しないように、フィルター２３、及び逆止弁２０が取り付けられている点が異なる。

【００８１】次に動作を説明する。第３実施例と同様に圧縮されたフレーク多孔質体５０ｂが送りスクリューと圧縮スクリューを通過した後ロータリーバルブ２内に押し出され、ロータリーバルブ２の途中で、液体配管２２から供給された液体２１と混合される。

【００８２】一般に、液体保持用の高分子弾性多孔質体（連通気泡）は、圧縮状態で液体内に入れた場合、圧縮状態が緩和されると高分子弾性多孔質体内部に液体が取り込まれる。

【００８３】従って、前述したようにロータリーバルブ２の前後で圧縮状態の緩和が行われるので、このロータリーバルブ２を圧力緩和手段として使用し、ロータリーバルブ２の途中で液体を供給する構成とすることにより、フレーク多孔質体５０ｂ内部に液体が取り込まれて液体含浸フレーク多孔質体５０ｃとなる。

【００８４】この後、第３実施例と同様の工程によって液体含浸フレーク多孔質体５０ｃを液体保持容器本体１０内に充填し、蓋を液体保持容器本体１０に超音波溶着等で固定することにより液体保持容器が完成する。

【００８５】第１実施例から第３実施例では、液体の注入工程は液体保持容器完成後に設けられていたが、本実施例ではフレーク多孔質体挿入工程前に注入が完了している。従って、第１実施例及び第３実施例では、高分子弾性多孔質体に十分に液体を浸透させるため、液体保持容器を一度真空にしてから注入するといった工程が設けられることになる。

【００８６】しかし、本実施例では搬送時に供給量や圧縮量を規制するためのロータリーバルブ２において液体をフレーク多孔質体に含浸させるため、液体保持容器内に多孔質体が充填された時にはインク充填も完了しているので、圧縮工程から装填工程に至るまでの搬送工程で液体を注入する工程を併設しているので、工程数は少なくて済み、生産性が格段に向上する。

【００８７】（第５実施例）本発明の液体保持容器の製造方法の第５実施例として、弾性多孔質体充填装置の概略断面図を図１２に示す。１及び３１はそれぞれ内部に送りスクリュー１４、１４ｂ及び圧縮スクリュー１５、１５ｂを組み込んだホッパーであり、送りスクリュー１４、１４ｂ及び圧縮スクリュー１５、１５ｂは外部のモーター１３、１６の駆動軸１３ａ、１６ａと接続されて

いる。

【００８８】ホッパー１に収容されたフレーク多孔質体５０は、送りスクリュー１４で圧縮スクリュー１５に送られ、更に圧縮スクリュー１５で圧縮されたフレーク多孔質体５０ｂが液体ホッパー３１に供給される。液体ホッパー３１には液体保持容器に注入される液体２１が収容されている。ここで、圧縮されたフレーク多孔質体５０ｂ（連通気泡）は急激に復元することにより、内部に液体が含浸される。

【００８９】次に、液体が含浸されたフレーク多孔質体５０ａは、送りスクリュー１４ｂで圧縮スクリュー１５ｂに送られ、更に圧縮スクリュー１５ｂで液体含浸フレーク多孔質体５０ｃが液体保持容器本体１０に充填されたときに所望の圧縮率になるように復元を考慮して圧縮され供給ノズル５ｂに送られる（途中配管不図示）。

【００９０】この時、圧縮された液体含浸フレーク多孔質体５０ｃから液体がしみ出るため、フィルター３２を介して排液ノズル３３が設けられしみ出た液体を排出するようになっている。

【００９１】なお、本実施例では、供給ノズル５ｂは１本であるためフレーク多孔質体５０ｂの落下防止と、配管長が長いための定量性の確保のために、供給ノズル５ｂの手前に、ロータリーバルブ２が取り付けられているが、これにこだわらない。このあとは前述の実施例と同様にして、液体保持容器が完成する。

【００９２】本実施例によれば、フレーク多孔質体５０をかなり圧縮した後、初期状態まで復元するため、フレーク多孔質体５０の内部まで、確実に液体を浸透可能である。

【００９３】更に、液体ホッパー３１を数回通す構成とすれば、より完全な含浸が可能である。

【００９４】本実施例を用いることにより、第４実施例の効果に加えて、フレーク多孔質体への液体含浸時に圧縮状態を完全に緩和できるために、前述の第４実施例におけるフレーク多孔質体のインク含浸量よりも各々のフレーク多孔質体の含浸量を多くでき、従って液体保持容器内の液体含浸量を多くすることができる。

【００９５】（第６実施例）本発明の液体保持容器の製造方法の第６実施例として、弾性多孔質体充填装置の概略断面図を図１３に示す。図１３（ａ）は充填初期を示し、図１３（ｂ）は充填終了時を示している。

【００９６】本実施例では、供給ノズル５ｂを、円管４１と多孔質体押さえ４２（アジャスター）より構成し、多孔質体押さえ４２の交換により、種々の形状の容器にも容易に対応可能とした点以外は前述した実施例と同様である。

【００９７】また、ホッパー１からロータリーバルブ２に接続されている配管よりも細い円管４１に変更したため、フレーク多孔質体５０ｂが落下しないための壁面への臨界押圧力を低くなるので、落下防止に対する確実性が向上する。

【００９８】本実施例の構成は、フレーク多孔質体を液体保持容器に供給するための供給ノズルを１本使用する方法には全て適用可能である。

【００９９】（第７実施例）図３に示した液体保持容器において、上述の製造方法を用いた場合、大気連通口近傍の圧縮されたフレーク多孔質体５０ｂは、蓋１１方向に働く復元力により、多少その圧縮率を低下させる可能性がある。

【０１００】従って、大気連通口近傍の大気と液体の境界面をより確実に形成するために、本実施例では、図１１に示された液体保持容器の製造装置を用いて、大気連通口近傍である液体保持容器の開口部（蓋１１が取付けられる部分）付近にフレーク多孔質体を装填する際に、液体をロータリーバルブに供給しないで、液体が含浸していないフレーク多孔質体を装填する工程を採る。

【０１０１】これにより、液体が含浸したフレーク多孔質体の圧縮率を全体的に均質にすることができ、液体が含浸したフレーク多孔質体の圧縮率が、液体導出口近傍の圧縮率より高くなることはないので、バッファ効果と共に、特に初期段階で液体の供給が安定する。

【０１０２】前述した第３実施例から第７実施例においては、供給ノズル５ｂから圧縮されたフレーク多孔質体５０ｂを押し出しながら供給ノズル５ｂを矢印Ｆの方向に一定速度で上昇させることにより、液体保持容器本体１０内に充填されたフレーク多孔質体５０ｂの圧縮率を均質にしていた。

【０１０３】しかしながら、第２実施例で述べたように、液体保持容器内部に収容された液体を十分に外部に供給し、収容された液体の使用効率を向上させるために、液体誘導体１０ａ側のフレーク多孔質体５０ｂあるいは液体含浸フレーク多孔質体５０ｃ等の弾性多孔質体の圧縮率（圧縮量）を高くすることが要求される。

【０１０４】本発明の第３実施例から第６実施例において、上述した圧縮率の勾配を実現することは、以下の制御を行うことで簡単に達成できる。

【０１０５】各実施例において、供給ノズル５ｂから圧縮されたフレーク多孔質体５０ｂ或いは液体含浸フレーク多孔質体５０ｃを押し出しながら供給ノズル５ｂを上昇させる際の上昇速度を、液体誘導体１０ａ側近傍ほど遅くする制御を行う。すなわち、圧縮率を徐々に低くするためには供給ノズルの開口部の移動速度を徐々に上げる事により、液体保持容器内の弾性多孔質体の圧縮率を所望の分布状態に制御することができる。

【０１０６】以上のように、前記多孔質体の容器内への充填速度を、充填開始部分から充填完了部分に至る過程で異なる様に制御することにより、容器の充填密度分布が液体取り出し部側を密にする事が可能となり、確実な液体供給が可能となる。

【０１０７】さらに、図１４に示した従来の高分子弾性

多孔質体を収容した液体保持容器において、一つの多孔質体を用いるために液体保持容器本体１０の下部の液体誘導体１０ａの周辺の空間１０ｂに高分子弾性多孔質体１２が充填されず、漏れ易い液体が貯まったり、高分子弾性多孔質体１２が保持できる液体量が減ってしまうという課題があったが、上述した第１実施例から第６実施例に示したフレーク多孔質体の製造方法を用いることにより、図３に示したようにフレーク多孔質体５０が空間１０ｂまで充填されるので、保持できる液体量の増加が可能となるとともに、インク漏れも防止することができる。

【０１０８】

【発明の効果】本発明の製造方法を用いることにより、液体を収納する液体保持容器内に配される多孔質体を、均質もしくは所望の圧縮分布をなすように装填することができるので、容器内に残留する液体量を少なくすることができる。

【０１０９】また、本発明の製造方法を用いることにより、容器の内部形状に関わらず、容器内部全体に多孔質体を充填することが可能であり、容器外部に液体が漏れる可能性はほとんどない。

【０１１０】さらに、本発明によれば、表面張力の異なる液体を収納する容器や、容積等の形状の異なる容器を用いる場合に、空孔率や形状の異なる弾性多孔質体を用意する必要はなく、同一種類の弾性多孔質体を用いて液体保持容器を製造することができる。

【０１１１】更に、本発明の製造方法を用いることにより、多孔質体装填工程や圧縮工程を完了させるとともに液体注入工程を完了させることが可能であり、液体保持容器の製造工程が短縮可能となり、生産性が大幅に向上した。

【図面の簡単な説明】

【図１】本発明に使用する液体保持容器を示した概略断面図

【図２】本発明に使用する液体保持容器を示した概略断面図

【図３】本発明を用いて製造した液体保持容器の概略断面図

【図４】本発明の液体保持容器の製造方法の第１実施例の充填装置の概略断面図

【図５】本発明の液体保持容器の製造方法の第１実施例の充填装置の概略断面図

【図６】本発明の液体保持容器の製造方法の第１実施例の充填装置の概略断面図

【図７】本発明の液体保持容器の製造方法の第２実施例の充填装置の概略断面図

【図８】本発明における第２実施例の多孔質体装填手順を説明した概略図

【図９】本発明における第２実施例の多孔質体装填手順を説明した概略図

【図１０】本発明の高分子液体保持容器の製造方法の第３実施例の充填装置の概略断面図

【図１１】本発明の高分子液体保持容器の製造方法の第４実施例の充填装置の概略断面図

【図１２】本発明の高分子液体保持容器の製造方法の第５実施例の充填装置の概略断面図

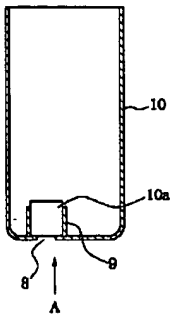
【図１３】本発明の高分子液体保持容器の製造方法の第６実施例の充填装置の概略断面図

【図１４】従来の高分子弾性多孔質体を収容した液体保持容器を示した概略図

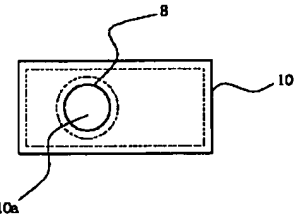
【符号の説明】

１　ホッパー
２　ロータリーバルブ
３　配管
４　エア導入口
５、５ａ、５ｂ　供給ノズル
８　液体導出口
９　液体誘導体保持壁
１０　液体保持容器本体
１０ａ　液体誘導体
１０ｂ　空間
１１　蓋
１１ａ　大気連通口
１２　高分子弾性多孔質体
１３、１６　モーター
１３ａ、１６ａ　駆動軸
１４、１４ｂ　送りスクリュー
１５、１５ｂ　圧縮スクリュー
２０　逆止弁
２１　液体
２２　液体配管
２３　フィルタ
３１　液体ホッパー
３２　フィルタ
３３　排液ノズル
４１　円管
４２　多孔質体押さえ（アジャスター）
５０　フレーク多孔質体
５０ｂ　圧縮されたフレーク多孔質体
５０ｃ　液体含浸フレーク多孔質体
１０１　装着ガイド
１０２ａ、１０２ｂ　可動板
１０３ａｘ、１０３ｂｘ、１０３ａｙ、１０３ｂｙ　可動壁（装填ガイド）
１０４ａ、１０４ｂ　可動蓋
１０５　ピストン
１０３１、１０３２、１０３５、１０３６　固定壁
１０３３、１０３４、１０３７、１０３８　可動壁

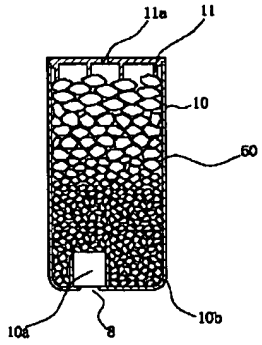
【図１】



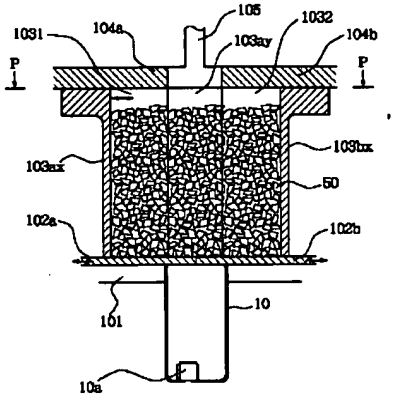
【図２】



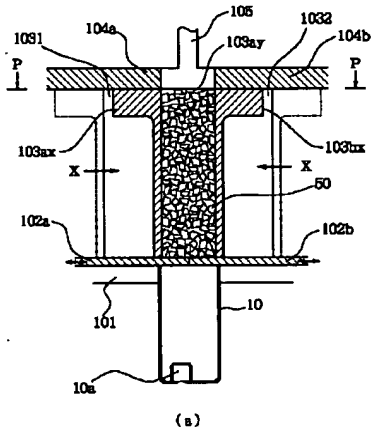
【図３】



【図４】



【図５】



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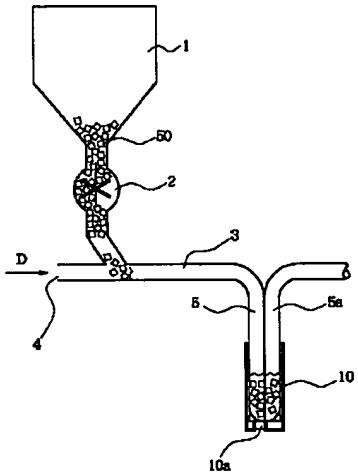

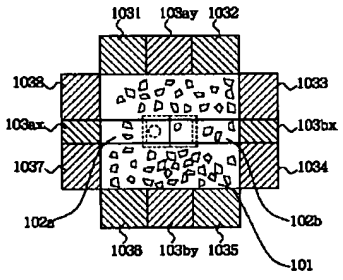

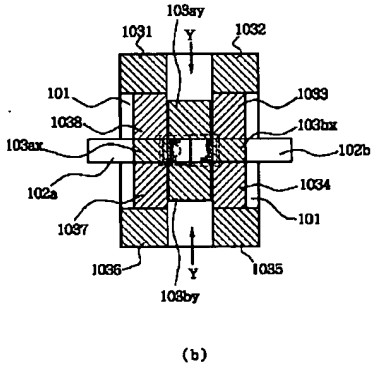

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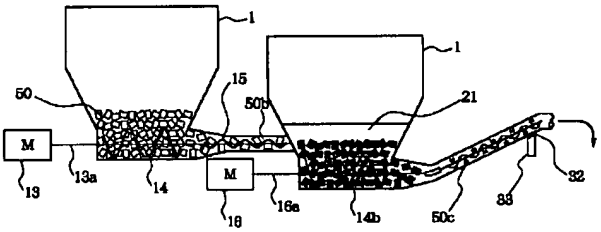

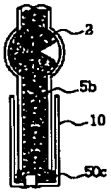

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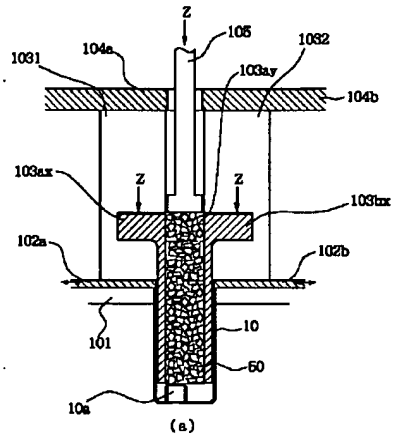

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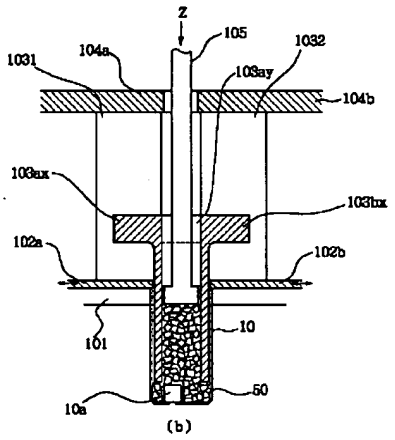

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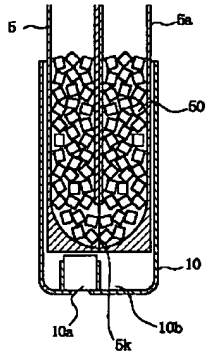

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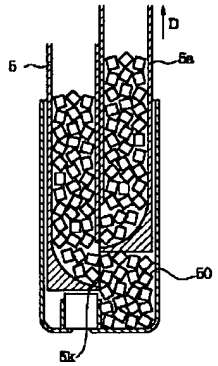

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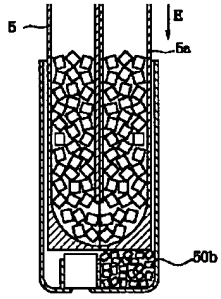

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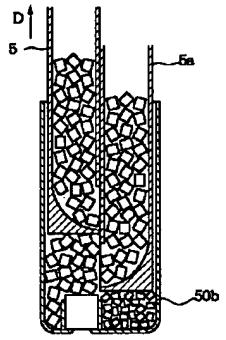

(d)

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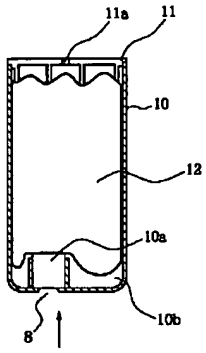

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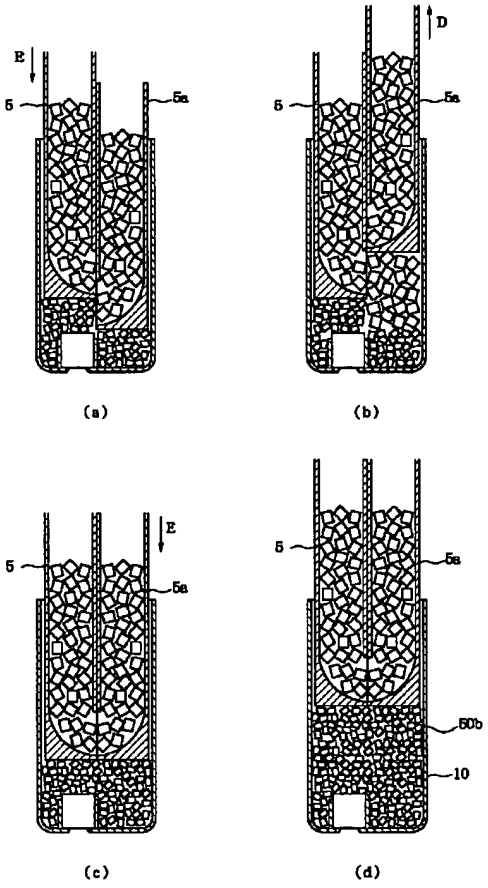
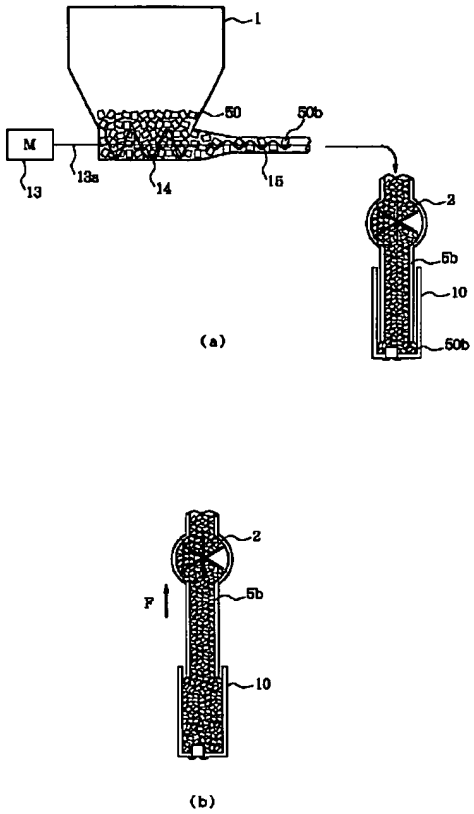
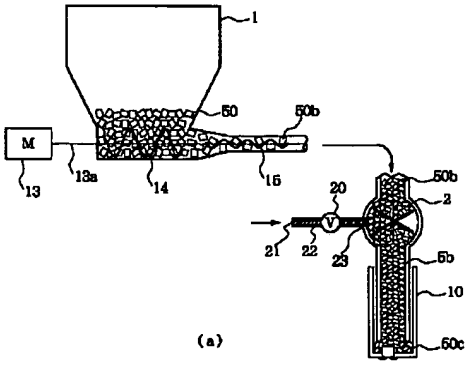
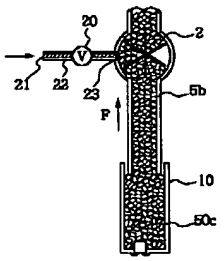

E
5
5a
(a)
D
5
5a
(b)
E
5
5a
(c)
5
5a
50b
10
(d)

【図１０】


1
50
50b
M
13
13a
14
15
2
5b
10
50b
(a)
2
F
5b
10
(b)

【図１１】





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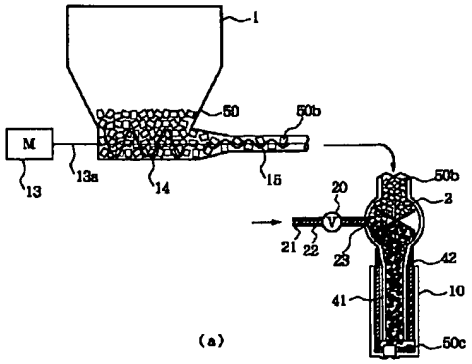

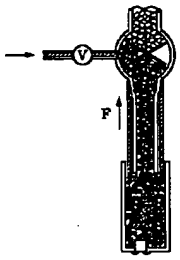

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CLAIMS

[Claim(s)]
[Claim 1] The manufacture approach of the liquid maintenance container characterized by having the pressing operation which compresses said two or more elastic porous bodies, and the loading process which loads with said porous body into a container so that only other porous bodies may be adjoined in the center section in a container in the manufacture approach of a liquid maintenance container of having the restoration section of an elastic porous body in a container.
[Claim 2] It is the manufacture approach of the liquid maintenance container according to claim 1 which the loading process of said elastic porous body is a process which loads with said elastic porous body into the amount container of requests, and said pressing operation is a process which compresses this loading process termination backward aforementioned elastic porous body, and is characterized by repeating said loading process and said pressing operation successively.
[Claim 3] It is the manufacture approach of the liquid maintenance container according to claim 1 to 2 characterized by for said loading process being a process supplied to said container by the elastic porous body supply means, and establishing two or more these elastic porous body supply means.
[Claim 4] Said pressing operation is the manufacture approach of the liquid maintenance container according to claim 2 to 3 characterized by being the process which uses said porosity supply means as an elastic porous body compression means.
[Claim 5] The manufacture approach of the liquid maintenance container according to claim 2 characterized by the amounts of compression of said elastic porous body in said pressing operation differing.
[Claim 6] The manufacture approach of the liquid maintenance container according to claim 1 characterized by performing said loading process after said pressing operation.
[Claim 7] The manufacture approach of the liquid maintenance container characterized by having the loading process which loads with said elastic porous body into a container, and the pressing operation which compresses said elastic porous body in the manufacture approach of a liquid maintenance container of having the restoration section of an elastic porous body in a container, and having the compression relaxation process of said elastic porous body between said pressing operations and loading processes.
[Claim 8] Said compression relaxation process is the manufacture approach of the liquid maintenance container according to claim 7 characterized by being carried out by the amount-of-supply control means to said container of said porous body.
[Claim 9] Said compression relaxation process is the manufacture approach of the liquid maintenance container according to claim 7 characterized by having a liquid supply process to said porous body.
[Claim 10] Said pressing operation and said compression relaxation process are the manufacture approach of the liquid maintenance container according to claim 9 characterized by being repeated two or more times.
[Claim 11] It is the manufacture approach of the liquid maintenance container according to claim 6 characterized by for said loading process being a process supplied to said container by the

elastic porous body supply means, and this elastic porous body supply means controlling the compressibility of the elastic porous body inside a container by having opening for loading the interior of said container with said elastic porous body, and controlling the passing speed of this opening.
[Claim 12] The manufacture approach of the liquid maintenance container characterized by having the loading process which loads with said elastic porous body into a constant-rate container, and the pressing operation which compresses said elastic porous body in the manufacture approach of a liquid maintenance container of having an elastic porous body in a container, and repeating said loading process and said pressing operation successively.
[Claim 13] It is the manufacture approach of the liquid maintenance container which has the loading process which loads with said elastic porous body into a container, and the pressing operation which compress said elastic porous body in the manufacture approach of a liquid maintenance container of having the restoration section of an elastic porous body in a container, and is characterized by for said loading process to consist of a process which loads with said elastic porous body to which the liquid sank in, and a process which load with said elastic porous body into which the liquid has not sunk.
[Claim 14] In the manufacture approach of a liquid maintenance container of having the restoration section of an elastic porous body in a container The loading process which loads with the conveyance process which conveys said two or more elastic porous bodies through piping to said container from the reservoir section which stores said elastic porous body, and said porous body into a container so that only other porous bodies may be adjoined in the center section in a container, It is the manufacture approach of the liquid maintenance container which **** and is characterized by said conveyance process being a process which decompresses and conveys said container and said piping.
[Claim 15] The manufacturing installation of the liquid maintenance container characterized by having the reservoir section which stores said two or more elastic porous bodies, a compression means to compress said two or more elastic porous bodies, and the charger stage which loads with said porous body into a container so that only other porous bodies may be adjoined in the center section in a container in the manufacturing installation of a liquid maintenance container which has the restoration section of an elastic porous body in a container.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the manufacture approach of the ink storage container used for the ink jet recording device which records by breathing out especially ink, and a manufacturing installation about the manufacture approach of the liquid maintenance container for storing a liquid in the interior, and a manufacturing installation.
[0002]
[Description of the Prior Art] The configuration which allots the foam for ink storage of a simple substance almost equal to the volume of the ink hold sections, such as an ink storage container, as a macromolecule elastic porous body for liquid maintenance to the interior was used for the ink storage container for storing conventionally the ink used for an ink jet recording device as

indicated by JP,63-87242,A, JP,5-692,U, etc.
[0003] These elastic porous bodies enable stable ink supply by setting up the amount of holes, and compressibility appropriately as indicated by JP,5-38816,A. Therefore, careful caution is needed when filled up with an elastic porous body in a container.
[0004] After applying the force to desired magnitude with the fixture currently indicated by JP,4-357046,A as the restoration approach to the ink storage container of an elastic porous body for that and compressing, there are an approach of inserting at another piston, an approach which moves after compression and is filled up with the urethane foam currently indicated by JP,5-463,A along with a guide.
[0005] However, although the above-mentioned restoration approach is effective when inserting the porous body of a simple substance in a container, in a configuration of not forming an ink stowage from the porous body of the simple substance currently indicated by JP,60-245562,A, JP,2-34353,A, etc. for example, it is difficult [it] to maintain the compression condition of two or more porous bodies at homogeneity, and to contain to an ink stores dept.
[0006] Moreover, since a porous body is made to deform near the ink feed hopper when it considers as the configuration which makes the ink feed hopper section project inside an ink container, and is made to transform a part of porous body, in order to raise the utilization ratio of the ink held in the ink stores dept., and to supply ink to an ink discharge part, it is the periphery which especially the wall of a porous body and a container contacts, and it is also difficult to prepare a desired pressure gradient.
[0007] Furthermore, even if it inserted the porous body [**** / the configuration] to the container which must be made into a design top L typeface or the complicated configuration of stair-like **, it was not easy to fill up homogeneity with compressibility etc. without a clearance, the utilization ratio of ink fell and useless space was generated in the container.
[0008] And when the container which holds the ink in which surface tension differs, and the container with which stockroom volume differs were filled up, two or more elastic porous bodies from which a void content and a configuration differ in accordance with a container needed to be prepared.
[0009]
[Problem(s) to be Solved by the Invention] This invention makes it the technical problem for the amount of liquids which remains in the container which is not filled up with the porous body allotted in the liquid maintenance container which contains a liquid so that desired compression distribution may be made, and it cannot derive outside to increase.
[0010] Moreover, the space where the porous body in the container resulting from the internal configuration of a container is not allotted is covered with a liquid, and this invention makes it the technical problem for a liquid to leak to the container exterior.
[0011] Furthermore, this invention makes it the technical problem to prepare the elastic porous body from which a void content and a configuration differ, when using the container which contains the liquid with which surface tension differs, and the container with which configurations, such as volume, differ.
[0012]
[Means for Solving the Problem] This invention offers the manufacture approach of the liquid maintenance container characterized by having the pressing operation which compresses two or more elastic porous bodies, and the loading process which loads with a porous body into a container so that only other porous bodies may be adjoined in the center section in a container as above-mentioned The means for solving a technical problem in the manufacture approach of a

liquid maintenance container of having the restoration section of an elastic porous body in a container.
[0013] Furthermore, the manufacture approach of the liquid maintenance container which solves the above-mentioned technical problem more certainly provides by considering as the manufacture approach of considering as the manufacture approach which a loading process and a pressing operation repeat successively after made the loading process of said elastic porous body into the process which loads with an elastic porous body into a constant-rate container and making a pressing operation into the process which compresses the elastic porous body after loading process termination, or performing said loading process after said pressing operation.
[0014] Moreover, the compression relaxation process of an elastic porous body is established between the pressing operation which compresses two or more elastic porous bodies, and a loading process, and the manufacture approach of a liquid maintenance container of having a liquid supply process to said porous body at this compression relaxation process is offered.
[0015] And in the manufacture approach of a liquid maintenance container of having an elastic porous body in a container, it has the loading process which loads with said elastic porous body into a constant-rate container, and the pressing operation which compresses said elastic porous body, and the manufacture approach of the liquid maintenance container characterized by repeating said loading process and said pressing operation successively is offered.
[0016] In addition, in the manufacturing installation of a liquid maintenance container which has the restoration section of an elastic porous body in a container, the manufacturing installation of the liquid maintenance container characterized by having the reservoir section which stores said two or more elastic porous bodies, a compression means to compress said two or more elastic porous bodies, and the charger stage which loads with said porous body into a container so that only other porous bodies may be adjoined in the center section in a container is offered.
[0017]
[Function] By adopting the above-mentioned approach, it is possible to make the compressibility of the elastic porous body inside a liquid maintenance container into the distribution condition which was adapted in activity eye over the whole liquid maintenance container.
[0018] And the container of the configuration of arbitration can be filled up with an elastic porous body.
[0019] Moreover, impregnation of a liquid can be made to complete when compression loading of the elastic porous body inside a liquid maintenance container is completed.
[0020]
[Example] The container filled up with a porous body is shown in drawing 1 and drawing 2 using the manufacture approach of the liquid maintenance container of this invention. It is liquid derivation opening for deriving to the exterior the liquid with which 10 was contained by the liquid maintenance container and 8 was contained inside the liquid maintenance container in drawing 1 .
[0021] 10a is a liquid derivative which promotes that the liquid stored in the interior of a liquid maintenance container is drawn outside here, and 9 is a liquid derivative maintenance wall for holding liquid derivative 10a. Moreover, drawing 2 looks at the maintenance container in drawing 1 from a pars-basilaris-ossis-occipitalis side (the direction of arrow-head A).
[0022] In addition, the container with which this invention is adapted is not restricted to the gestalt shown in drawing 1 and drawing 2 , and as you may be the configuration where the filter was prepared at the head of the interior of a liquid container of the liquid derivative maintenance wall in drawing 1 , without using liquid induction member 10a and it was shown in drawing 2 , it

does not have the need that a cross-section configuration is a rectangular parallelepiped, either.
[0023] The liquid maintenance container manufactured as an ink tank which uses this invention for the liquid maintenance container shown in drawing 1 and drawing 2 , for example, is used for an ink jet recording device is shown in drawing 3 . In drawing 3 , 11 is a lid which plugs up opening for porous body insertion of a liquid maintenance container, and 11a is atmospheric-air free passage opening which makes the interior of a liquid maintenance container established in the lid 11, and the exterior open for free passage.
[0024] And 50 is a macromolecule elastic porous body and is small fabricated as compared with the content volume of a liquid maintenance container. The porous body which two or more these porous bodies 50 were formed in the liquid maintenance container, and the porous body allotted to the center section in a container etc. adjoined only other porous bodies, and was allotted near the wall of a liquid maintenance container adjoins the both sides of other porous bodies and the wall of said liquid maintenance container.
[0025] If the magnitude and the configuration of this porous body 50 can be loaded with more than one among all the walls inside an ink container, they are good. Therefore, the magnitude or the configurations of two or more porous bodies of all instead of what is restricted to a rectangular parallelepiped, a globular form, etc. again do not need to be equal. Hereafter, a porous body 50 is called a flake porous body in this invention.
[0026] As mentioned above, in this invention, not a porous body but the flake porous body of the simple substance which has the magnitude of a container which occupies the whole mostly are used as a porous body for holding a liquid, but when loaded into a liquid maintenance container, it is loaded with this flake porous body so that two or more porous bodies may be in the condition of it having been compressed mutually and having adjoined.
[0027] In addition, it is more desirable to arrange the magnitude of the flake porous body 50 and a configuration to some extent, when there are needs, such as to perform supply which equipped for example, the ink jet recording apparatus etc. with the liquid maintenance container using this invention, and was certainly stabilized in the ink jet recording apparatus in ink.
[0028] This invention hereafter used in order to manufacture an above-mentioned liquid maintenance container is explained to a detail based on a drawing. Magnitude of a flake porous body was used as 5mm angle in each example.
[0029] (The 1st example) The 1st example of the manufacture approach of the liquid maintenance container of this invention is shown in drawing 6 from drawing 4 . Drawing 4 (a) and (b) show the process which supplies the flake porous body 50 with which it is loaded into a liquid maintenance container to flake porous body restoration equipment. Drawing 4 (a) is the cross-section schematic diagram of the restoration equipment of a flake porous body, and drawing 4 (b) is a P-P sectional view schematic diagram in drawing 4 (a). And drawing 5 and drawing 6 show the pressing operation of a flake porous body, and the loading process to a liquid maintenance container.
[0030] In drawing 4 , 101 is a wearing guide for equipping liquid attachment component 10 at flake porous body restoration equipment, and 102a and 102b are movable plates. 1033, 1034, 103bx, 1037 and 1038, and 103ax are the movable walls for compressing a flake porous body into the longitudinal direction in the cross section of the liquid maintenance container shown in drawing 4 (b).
[0031] Moreover, the movable walls for compressing a flake porous body in the direction which intersects perpendicularly with the above-mentioned longitudinal direction are 103ay(s) and 103b(ies). 1031, 1032, 1035, and 1036 are fixed walls, and also become a guide at the time of the

movable wall of the above-mentioned 2-way moving.
[0032] In this example, after compressing into the above-mentioned longitudinal direction, although compressed in the direction which intersects perpendicularly with it, the sequence of the compression direction may be replaced by using 1033, 1034, 1037, and 1038 as a fixed wall, not restricting in order of this process and using the above-mentioned fixed wall as a movable wall.
[0033] And in drawing 4 (a), 104a and 104b are movable lids, and 105 is a piston for compressing a flake porous body, and forms the compression space of a flake porous body in the height direction of the liquid maintenance container in drawing with movable plates 102a and 102b, the above-mentioned wearing guide 101, and above-mentioned movable wall and fixed wall. Here, when supplying a flake porous body to restoration equipment, one side or the both sides of the movable lids 104a or 104b is moved. The amount of the flake to supply is determined by volume, compressibility, or capillary tube force required of a liquid maintenance container.
[0034] Next, a pressing operation and a loading process are explained using drawing 5 and drawing 6 . Drawing 5 (a) is the cross-section schematic diagram of the restoration equipment of the flake porous body in a pressing operation, and drawing 5 (b) is a P-P sectional view schematic diagram in drawing 5 (a). Drawing 6 (a) and drawing 6 (b) are the cross-section schematic diagrams of the restoration equipment of the flake porous body to a liquid maintenance container.
[0035] As mentioned above, in order to compress into the longitudinal direction of the liquid maintenance container in drawing 2 , the movable walls 1033 (un-illustrating) and 1034 (un-illustrating), 103bx, 1037 (un-illustrating) and 1038 (un-illustrating), and 103ax move in the direction shown in drawing 5 (a) by the arrow head X. then, movable in the direction of a minor axis of the cross section of the liquid maintenance container in the direction shown in drawing 5 (b) by the arrow head Y, i.e., drawing 2 , -- wall 103ay and 103b(ies) move, and compression of the 2-way of a flake porous body is completed.
[0036] At this time, the loading guide for loading with the flake porous body compressed by 103ax, 103bx, 103ay, and 103by into the liquid maintenance container is formed.
[0037] And a piston 105 also moves with 103ax(es) which form the above-mentioned loading guide in the direction shown in drawing 6 (a) by the arrow head Z, 103bx, 103ay, and 103by. Moreover, 102a and 102b move so that a loading guide can insert into a liquid maintenance container. Since the pressure welding is mutually carried out so that a flake porous body may press 103ax(es), 103bx, 103ay, and 103by at this time, it does not fall in the liquid maintenance container 10.
[0038] After a loading guide is inserted into a liquid maintenance container, as shown in drawing 6 (b), only a piston 105 moves to an arrow-head Z direction, and compresses a flake porous body. Therefore, a flake porous body is compressed in the three directions of level and the perpendicular direction in a liquid maintenance container, and a pressing operation is completed. Then, a piston 105 remains as it is, moves a loading guide in the direction of drawing Nakagami, and ends the loading process of a flake porous body.
[0039] By ultrasonic welding etc., a lid 11 is fixed, as shown in drawing 3 , and the production process of a liquid maintenance container completes the liquid maintenance container which ended the above pressing operation and loading process.
[0040] As shown in this example, by using the manufacture approach of the liquid maintenance container characterized by having the pressing operation which compresses two or more flake

porous bodies, and the loading process which loads with a flake porous body into a container so that only other flake porous bodies may be adjoined in the center section in a container, it is not concerned with the internal configuration of a liquid maintenance container, but fills up with a porous body in [whole] a container.
[0041] Furthermore, it can respond to volume modification of a liquid maintenance container and modification of compressibility only by changing the amount of the flake porous body with which it fills up. Moreover, a bias does not occur in the compression condition inside the liquid maintenance container of a porous body. Therefore, the ink residual resulting from the compressibility of the porous body in a liquid maintenance container being locally high is also improvable.
[0042] And in this example, since the liquid derivation section which was shown in drawing 14 and in which liquid derivation opening is prepared conventionally like the configuration projects inside a container, it is possible to give the inclination of the compressibility near the liquid derivation section at the time of loading of drawing 6 .
[0043] (The 2nd example) As the 2nd example of the manufacture approach of the liquid maintenance container of this invention, the cross-section schematic diagram of the restoration equipment of a porous body is shown in drawing 7 .
[0044] In drawing 7 , 1 is a hopper which holds the flake porous body 50. And 2 is a rotary valve for preventing and carrying out constant feeding of the back run of the flake porous body 50, and 5 and 5a are the supply nozzles for inserting the flake porous body 50 in the interior of the body 10 of a liquid maintenance container. 3 is piping for conveying a flake porous body in a liquid maintenance container, and the air inlet 4 for drawing in Ayr used for conveyance in piping 3 is established in this piping.
[0045] Here, from a hopper 1, the flake porous body 50 passes along a rotary valve 2, and is conveyed by the supply nozzle 5 via the flexible piping 3 by Ayr pressurized in the direction of arrow-head D shown in drawing 7 . Similarly, the flake porous body 50 is conveyed by supply nozzle 5a from another hopper (un-illustrating). Both the supply nozzles 5 and 5a are inserted in the interior of the body 10 of a liquid maintenance container, and load with an elastic porous body into a liquid maintenance container.
[0046] It is more desirable when the inside of a liquid maintenance container is made into reduced pressure or a vacua with the means of arbitration, in order to insert a flake porous body in a liquid maintenance container certainly at this time.
[0047] The method of changing only the body of a liquid maintenance container into a vacuum or a reduced pressure condition, and conveying a flake porous body as the conveyance approach of a flake porous body, in addition to the above, is mentioned. Moreover, there is also a method of conveying a flake porous body by making piping by the side of a liquid maintenance container into a vacuum or a reduced pressure condition, in view of a liquid maintenance container and the hopper 1 which is an elastic porous body stores dept. At this time, the reduced pressure section considers as the configuration prepared in two or more places of piping, and it may establish reduced pressure inclination so that a vacuum may be approached more, as it faces to a liquid maintenance container.
[0048] When detaching and attaching a liquid maintenance container, while being able to prevent that a flake porous body jumps out of a supply nozzle compared with carrying out [which is only called at Ayr when the conveyance approach mentioned above is used] application-of-pressure conveyance, the amount of supply of a flake porous body can be controlled more certainly.
[0049] Next, the production process which has the insertion process and compression stroke of a

flake porous body of this example is explained using drawing 8 and drawing 9 .
[0050] Drawing 8 (a) is in the condition that the supply nozzles 5 and 5a were inserted in the interior of the body 10 of a liquid maintenance container as shown in drawing 7 . ****** [the number of them / in this example / what] although the supply nozzle has become two.
[0051] However, to the case of one, it is necessary to take pressure balancing of a porous body into consideration so that it may not be loaded with a flake porous body by the flake porous body 50 falling from a supply nozzle etc. more than the desired amount of supply. Since opening 5k for supply is not usually exposed to the case of two like this example, a flake porous body does not fall and it is more desirable than the case of one.
[0052] It is made to go up like drawing 8 (b), after a supply nozzle is inserted into a liquid maintenance container until opening 5k of the supply nozzle 5 exposes supply nozzle 5a thoroughly first. Here, although a motorised ball screw is sufficient also as a pneumatic cylinder, the driving source to raise is better [the motorised ball screw], when the below-mentioned actuation is considered.
[0053] Here, constant feeding of the flake porous body 50 is carried out from the supply nozzle 5. Control of the amount of supply of the flake porous body in this case is performed by the application-of-pressure pressure of Ayr, and the rotary valve 2, and that quantum nature is secured. When precision is required from the amount of supply, it is good to use the extruder of a screw type etc.
[0054] Next, supply nozzle 5a is dropped to the soffit of the supply nozzle 5 like drawing 8 (c). Thereby, the flake porous body 50 is compressed and will be in the condition of 50b. However, in order that this amount of descent may determine the compressibility of the flake porous body 50, the soffit of both supply nozzles is not necessarily in agreement. Generally, although the compressibility in an ink jet recording device changes with surface tension of ink, it is set up 3 to 6 times.
[0055] And shortly, in order to fill up the supply nozzle 5 bottom with the flake porous body 50, it is raised until opening of supply nozzle 5a exposes the supply nozzle 5 to the appearance shown in drawing 8 (d) thoroughly, next constant feeding of the flake porous body 50 is carried out to it from the supply nozzle 5.
[0056] Then, as shown in drawing 9 (a), the supply nozzle 5 is dropped until the flake porous body 50 becomes desired compressibility.
[0057] Next, after making it go up like the process of drawing 8 (b) and drawing 8 (c) as shown in drawing 9 (b) and drawing 9 (c) until opening 5k of the supply nozzle 5 exposes supply nozzle 5a thoroughly, supply nozzle 5a is dropped to the soffit of the supply nozzle 5, and a flake porous body is compressed.
[0058] These are repeated below, finally it changes into the condition of drawing 9 (d), and the supply nozzles 5 and 5a are raised. Thus, after the compression stroke by the supply nozzle, in order to take the gestalt which makes the insertion process and compression stroke of a flake porous body repeat, when shifting to an insertion process, the stability of flake porous body 50b compressed into parallel in the migration direction of a supply nozzle works. However, in order to act also on flake porous body 50b which makes a right angle in the compression direction by the supply nozzle and which adjoins horizontally, before the following compression stroke starts, it does not restore even to the magnitude before a flake porous body compressing.
[0059] After filling up the body 10 of a liquid maintenance container with the flake porous body 50 as mentioned above, as shown in drawing 3 , it is fixed to the body 10 of a liquid maintenance container by ultrasonic welding etc., and the production process of a liquid maintenance

container completes the lid 101 with which atmospheric-air free passage opening 101a for adopting air was prepared in the interior of a liquid maintenance container.
[0060] Although flake porous body 50b into which it was compressed near the atmospheric-air free passage opening may reduce the compressibility somewhat, since it does not become higher than the compressibility near the liquid derivation opening here according to the stability committed to the supply nozzle path of insertion, there is little effect on the liquid supply effectiveness by restoration of a flake porous body. On the other hand, the flake porous body by which the compression condition was eased may work in buffer room, and can also desire the prevention effectiveness of liquid leakage from atmospheric-air free passage opening.
[0061] In this example, the supply nozzle of a flake porous body can be made into two, the configuration inserted into a container since it is used as a flake porous body compression means only as a flake porous body supply means can be simplified, and it is suitably usable also to a small liquid maintenance container. Moreover, rather than the case of one, thrust of a flake porous body to the direction which intersects perpendicularly with the path of insertion of a supply nozzle can also be strengthened more, and can extend the adaptation range of compressibility.
[0062] By using this example, it can respond flexibly like the 1st example only by controlling the amount of compression by the amount of supply and the supply nozzle of a flake porous body also to modification of a container configuration or compressibility.
[0063] Furthermore, in order to make high the compressibility of the porous body near the liquid derivation opening to the exterior equipped with liquid derivative 10a and to raise the utilization ratio of the ink in a liquid maintenance container, compared with the 1st example, control of pressure distribution is easy and exact. [that what is necessary is just to set up the amount of compression by the supply nozzle highly near the liquid derivation opening]
[0064] Moreover, since the precision can be adjusted when the compressibility in the usual liquid maintenance container also controls the amount of supply of the flake porous body in the case of repeating an insertion process and a compression stroke, compared with the former, more homogeneous compression distribution of a porous body is realizable in the whole container.
[0065] Moreover, since the approach of compressing after loading with a flake porous body as compared with the 1st example is adopted, it can respond to a large area more to modification of the compressibility of a liquid maintenance container.
[0066] (The 3rd example) As the 3rd example of the manufacture approach of the macromolecule liquid maintenance container of this invention, the cross-section schematic diagram of porous body restoration equipment is shown in drawing 10 . (a) of drawing 10 shows the early stages of restoration, and drawing 10 (b) shows the time of restoration termination.
[0067] 1 is the hopper which included the delivery screw 14 and the compression screw 15 in the interior here, and the delivery screw 14 and the compression screw 15 are connected with driving shaft 13a of the external motor 13. The flake porous body 50 held in the hopper 1 is sent to the part in which the compression screw 15 was formed with the delivery screw 14.
[0068] And flake porous body 50b compressed by the compression screw 15 is compressed. When the body 10 of a liquid maintenance container is filled up through a conveyance path (un-illustrating) from a compression screw 15, the compressibility in this case is determined in consideration of the restoration after compression of a flake porous body so that it may become desired compressibility.
[0069] Here, as for the delivery screw 14 and the compression screw 15, the pitch differs from the appearance. The pipe diameter of a compression screw is fixed and what combined the

configuration with the fixed delivery pitch of a screw or the above-mentioned configuration which is two is used for the configuration to which the delivery pitch of a screw becomes narrow gradually, and the taper-like cylinder by which a pipe diameter becomes small gradually.
[0070] Moreover, since a flake porous body is compressed mutually and suits it in the form which presses the wall of piping which is a conveyance path since the flake porous body after compression is sent by the compression screw even if it uses one supply nozzle, the drop by opening of a supply nozzle can be prevented.
[0071] However, since it may fall depending on the magnitude of flake porous body 50b, and the relation of a bearer rate, in this example, the rotary valve 2 was attached into the path from a compression screw to supply nozzle 5b, and drop has been prevented certainly. Here, the amount of compression of a flake porous body and the bearer rate amount of supply are controlled by considering as the configuration which transmits the conveyance pressure of setting up the blade in a rotary valve so that it may have space between the wall surfaces in a bulb.
[0072] Setting before and after a rotary valve 2 in this example, for flake porous body 50b, a hopper 1 side is several kg/cm2 by the compression screw 15. By the supply nozzle 5b side, it has restored even to extent which presses the wall of supply nozzle 5b so that flake porous body 50b may not fall with atmospheric pressure fundamentally to being in the condition currently pressurized.
[0073] Therefore, by arranging this rotary valve 2 near the supply nozzle, when the piping length for conveyance is long, the amount of supply and the compressibility of the flake porous body 50 can be controlled.
[0074] Next, operations sequence is explained. First, like drawing 10 (a), where supply nozzle 5b is inserted in the body 10 of a liquid maintenance container, a motor 13 and a rotary valve 2 are operated, and flake porous body 50b compressed from supply nozzle 5b is extruded in a liquid maintenance container. At this time, it controls by raising supply nozzle 5b to make almost equal the compressibility of flake porous body 50b with which it filled up in the body 10 of a liquid maintenance container, extruding.
[0075] Next, after being filled up with a desired fill like drawing 10 (b), a motor 13 and a rotary valve 2 raise stop and supply nozzle 5b. Above, restoration of the flake porous body 50 is completed, like the 2nd example, it is fixed to the body 10 of a liquid maintenance container by ultrasonic welding etc., and a liquid maintenance container completes a lid.
[0076] In addition, although supply nozzle 5b was raised in this example, extruding compressed flake porous body 50b, when the height of the body 10 of a liquid maintenance container is low, it is not necessary to move supply nozzle 5b.
[0077] By using the above-mentioned manufacture approach, the whole interior of a liquid maintenance container can be loaded with a porous body, it can respond to a container configuration or desired compressibility upwards, and nearby homogeneity can be loaded with a flake porous body from the 1st and 2nd examples.
[0078] The liquid is not poured into the interior in the phase where the liquid maintenance container was manufactured in the 3rd example from the 1st example. Therefore, ink impregnation will be performed to the liquid maintenance container of the gestalt shown in drawing 3 . After attracting the gas inside a container from the liquid derivation opening 8 and making the interior of a container into a vacua or the condition near it as the ink impregnation approach in this case, the approach of carrying out application-of-pressure impregnation of the ink through the liquid derivation opening 8 again etc. is mentioned.
[0079] (The 4th example) As the 4th example of the manufacture approach of the liquid

maintenance container of this invention, the outline sectional view of elastic porous body restoration equipment is shown in drawing 11 . Drawing 11 (a) shows the early stages of restoration, and drawing 11 (b) shows the time of restoration termination.
[0080] Although the fundamental configuration is the same as that of the 3rd example almost, in the middle of a rotary valve 2, the liquid piping 22 is connected, and for this liquid piping 22, it differs in that the filter 23 and the check valve 20 are attached so that flake porous body 50b compressed from the rotary-valve 2 side may not flow.
[0081] Next, actuation is explained. After flake porous body 50b compressed like the 3rd example passes a delivery screw and a compression screw, it extrudes in a rotary valve 2, and it is mixed with the liquid 21 supplied from the liquid piping 22 in the middle of a rotary valve 2.
[0082] Generally, when the macromolecule elastic porous body for liquid maintenance (free passage air bubbles) is put in in a liquid in the state of compression, if a compression condition is eased, a liquid will be incorporated inside a macromolecule elastic porous body.
[0083] Therefore, since relaxation of a compression condition is performed before and behind a rotary valve 2 as mentioned above, by using this rotary valve 2 as a pressure relaxation means, and considering as the configuration which supplies a liquid in the middle of a rotary valve 2, a liquid is incorporated inside flake porous body 50b, and it is set to liquid impregnation flake porous body 50c.
[0084] Then, it is filled up with liquid impregnation flake porous body 50c in the body 10 of a liquid maintenance container according to the same process as the 3rd example, and a liquid maintenance container completes a lid by fixing to the body 10 of a liquid maintenance container by ultrasonic welding etc.
[0085] Although the impregnation process of a liquid was established after liquid maintenance container completion in the 3rd example from the 1st example, impregnation is completed before a flake porous body insertion process in this example. Therefore, in the 1st example and the 3rd example, in order to make a liquid fully permeate a macromolecule elastic porous body, the process of pouring in once it makes a liquid maintenance container into a vacuum will be established.
[0086] however, since the process which pours in a liquid at a conveyance process until it results [from a pressing operation] in a loading process since ink restoration has also been completed when a porous body is filled up with this example in a liquid maintenance container, in order to carry out impregnation of the liquid to a flake porous body in the rotary valve 2 for regulating the amount of supply and the amount of compression at the time of conveyance has been put side by side, there are few routing counters and they end, and productivity boils them markedly and improves.
[0087] (The 5th example) As the 5th example of the manufacture approach of the liquid maintenance container of this invention, the outline sectional view of elastic porous body restoration equipment is shown in drawing 12 . 1 and 31 are each the hoppers which included the delivery screws 14 and 14b and compression screws 15 and 15b in the interior, and the delivery screws 14 and 14b and compression screws 15 and 15b are connected with the driving shafts 13a and 16a of the external motors 13 and 16.
[0088] Flake porous body 50b which the flake porous body 50 held in the hopper 1 was sent to the compression screw 15 with the delivery screw 14, and was further compressed by the compression screw 15 is supplied to the liquid hopper 31. The liquid 21 poured into a liquid maintenance container is held in the liquid hopper 31. Here, impregnation of the liquid is carried out to the interior by restoring rapidly compressed flake porous body 50b (free passage air

bubbles).
[0089] Next, flake porous body 50a to which impregnation of the liquid was carried out is sent to compression screw 15b by delivery screw 14b, when liquid impregnation flake porous body 50c is further filled up with compression screw 15b into the body 10 of a liquid maintenance container, is compressed in consideration of restoration and sent to supply nozzle 5b so that it may become desired compressibility (middle piping un-illustrating).
[0090] Since a liquid oozes from compressed liquid impregnation flake porous body 50c at this time, the liquid with which the effluent nozzle 33 was formed and oozed through the filter 32 is discharged.
[0091] In addition, although the rotary valve 2 is attached before supply nozzle 5b in this example for reservation of the quantum nature for the safety catch and piping length of flake porous body 50b being long since supply nozzle 5b is one, it does not adhere to this. A liquid maintenance container is completed like the above-mentioned example after this.
[0092] Since according to this example it restores to an initial state after compressing the flake porous body 50 considerably, a liquid can be certainly permeated to the interior of the flake porous body 50.
[0093] Furthermore, the configuration which lets the liquid hopper 31 pass several times, then more perfect impregnation are possible.
[0094] Since a compression condition can be thoroughly eased by using this example at the time of the liquid impregnation to a flake porous body in addition to the effectiveness of the 4th example, the amount of impregnation of each flake porous body can be made [more] than the amount of ink impregnation of the flake porous body in the 4th above-mentioned example, therefore the amount of liquid impregnation in a liquid maintenance container can be made [many].
[0095] (The 6th example) As the 6th example of the manufacture approach of the liquid maintenance container of this invention, the outline sectional view of elastic porous body restoration equipment is shown in drawing 13 . Drawing 13 (a) shows the early stages of restoration, and drawing 13 (b) shows the time of restoration termination.
[0096] At this example, it is the same as that of the example which constituted supply nozzle 5b from a tube 41 and porous body presser foot 42 (adjuster), and mentioned it above by exchange of the porous body presser foot 42 except the point whose response was enabled easily also at the container of various configurations.
[0097] Moreover, since it changed into the tube 41 thinner than piping connected to the rotary valve 2 from the hopper 1 and becomes low about the critical thrust to a wall surface for flake porous body 50b not to fall, the soundness over a safety catch improves.
[0098] The configuration of this example can apply altogether the supply nozzle for supplying a flake porous body to a liquid maintenance container to the approach of using it one.
[0099] (The 7th example) In the liquid maintenance container shown in drawing 3 , when the above-mentioned manufacture approach is used, flake porous body 50b into which it was compressed near the atmospheric-air free passage opening may reduce the compressibility somewhat according to the stability committed in the lid 11 direction.
[0100] Therefore, in order to form more certainly the atmospheric air near the atmospheric-air free passage opening, and the interface of a liquid, in this example, the process which loads with the flake porous body into which the liquid has not sunk without supplying a liquid to a rotary valve, in case it loads with a flake porous body near opening (part in which a lid 11 is attached) of the liquid maintenance container which it is near the atmospheric-air free passage opening

using the manufacturing installation of the liquid maintenance container shown in drawing 11 is taken.

[0101] On the whole, the compressibility of the flake porous body into which the liquid sank can be made into homogeneity by this, and since the compressibility of the flake porous body into which the liquid sank does not become higher than the compressibility near the liquid derivation opening, supply of a liquid is stabilized especially in an initial stage with the buffer effectiveness.

[0102] The compressibility of flake porous body 50b with which it filled up in the body 10 of a liquid maintenance container was made into homogeneity by raising supply nozzle 5b with constant speed in the direction of an arrow head F, extruding flake porous body 50b compressed from supply nozzle 5b in the 7th example from the 3rd example mentioned above.

[0103] However, as the 2nd example described, in order to fully supply outside the liquid held in the interior of a liquid maintenance container and to raise the utilization ratio of the held liquid, it is required that the compressibility (amount of compression) of elastic porous bodies, such as flake porous body 50b by the side of liquid derivative 10a or liquid impregnation flake porous body 50c, should be made high.

[0104] Realizing the inclination of the compressibility mentioned above in the 6th example from the 3rd example of this invention can be easily attained by performing the following control.

[0105] In each example, control to which a liquid derivative 10a close-attendants side makes late the climbing speed at the time of raising supply nozzle 5b is performed, extruding flake porous body 50b or liquid impregnation flake porous body 50c compressed from supply nozzle 5b. That is, in order to make compressibility low gradually, the compressibility of the elastic porous body in a liquid maintenance container is controllable in the desired distribution condition by gathering the passing speed of opening of a supply nozzle gradually.

[0106] As mentioned above, by controlling the restoration rate into the container of said porous body to differ in the process in which it results [from a restoration initiation part] in the completion part of restoration, pack density distribution of a container becomes possible [making a liquid takeoff-connection side dense], and the positive liquid supply of it is attained.

[0107] Furthermore, it sets in the liquid maintenance container which held the conventional macromolecule elastic porous body shown in drawing 14 . Although the technical problem that the liquid which surrounding space 10b of liquid derivative 10a of the lower part of the body 10 of a liquid maintenance container is not filled up with the macromolecule elastic porous body 12, but is easy to leak will be saved, or the amount of liquids which can hold the macromolecule elastic porous body 12 will become less occurred in order to use one porous body Ink leakage can also be prevented while the increment in the amount of liquids which can be held is attained, since it fills up with the flake porous body 50 to space 10b as by using the manufacture approach of the flake porous body shown in the 6th example from the 1st example mentioned above showed to drawing 3 .

[0108]

[Effect of the Invention] Since it can load with the porous body allotted in the liquid maintenance container which contains a liquid by using the manufacture approach of this invention so that homogeneity or desired compression distribution may be made, the amount of liquids which remains in a container can be lessened.

[0109] Moreover, by using the manufacture approach of this invention, it is not concerned with the internal configuration of a container, but it is possible to fill up the whole interior of a container with a porous body, and there is almost no possibility that a liquid will leak to the

container exterior.
[0110] Furthermore, when using the container which contains the liquid with which surface tension differs, and the container with which configurations, such as volume, differ according to this invention, it is not necessary to prepare the elastic porous body from which a void content and a configuration differ, and a liquid maintenance container can be manufactured using the elastic porous body of the same class.
[0111] Furthermore, by using the manufacture approach of this invention, while making the porous body loading process and the pressing operation complete, it was possible to have made a liquid impregnation process complete, compaction of the production process of a liquid maintenance container was attained, and its productivity improved substantially.

TECHNICAL FIELD

[Industrial Application] This invention relates to the manufacture approach of the ink storage container used for the ink jet recording device which records by breathing out especially ink, and a manufacturing installation about the manufacture approach of the liquid maintenance container for storing a liquid in the interior, and a manufacturing installation.

PRIOR ART

[Description of the Prior Art] The configuration which allots the foam for ink storage of a simple substance almost equal to the volume of the ink hold sections, such as an ink storage container, as a macromolecule elastic porous body for liquid maintenance to the interior was used for the ink storage container for storing conventionally the ink used for an ink jet recording device as indicated by JP,63-87242,A, JP,5-692,U, etc.
[0003] These elastic porous bodies enable stable ink supply by setting up the amount of holes, and compressibility appropriately as indicated by JP,5-38816,A. Therefore, careful caution is needed when filled up with an elastic porous body in a container.
[0004] After applying the force to desired magnitude with the fixture currently indicated by JP,4-357046,A as the restoration approach to the ink storage container of an elastic porous body for that and compressing, there are an approach of inserting at another piston, an approach which moves after compression and is filled up with the urethane foam currently indicated by JP,5-463,A along with a guide.
[0005] However, although the above-mentioned restoration approach is effective when inserting the porous body of a simple substance in a container, in a configuration of not forming an ink stowage from the porous body of the simple substance currently indicated by JP,60-245562,A, JP,2-34353,A, etc. for example, it is difficult [it] to maintain the compression condition of two or more porous bodies at homogeneity, and to contain to an ink stores dept.
[0006] Moreover, since a porous body is made to deform near the ink feed hopper when it considers as the configuration which makes the ink feed hopper section project inside an ink container, and is made to transform a part of porous body, in order to raise the utilization ratio of the ink held in the ink stores dept., and to supply ink to an ink discharge part, it is the periphery which especially the wall of a porous body and a container contacts, and it is also difficult to

prepare a desired pressure gradient.
[0007] Furthermore, even if it inserted the porous body [**** / the configuration] to the container which must be made into a design top L typeface or the complicated configuration of stair-like **, it was not easy to fill up homogeneity with compressibility etc. without a clearance, the utilization ratio of ink fell and useless space was generated in the container.
[0008] And when the container which holds the ink in which surface tension differs, and the container with which stockroom volume differs were filled up, two or more elastic porous bodies from which a void content and a configuration differ in accordance with a container needed to be prepared.

EFFECT OF THE INVENTION

[Effect of the Invention] Since it can load with the porous body allotted in the liquid maintenance container which contains a liquid by using the manufacture approach of this invention so that homogeneity or desired compression distribution may be made, the amount of liquids which remains in a container can be lessened.
[0109] Moreover, by using the manufacture approach of this invention, it is not concerned with the internal configuration of a container, but it is possible to fill up the whole interior of a container with a porous body, and there is almost no possibility that a liquid will leak to the container exterior.
[0110] Furthermore, when using the container which contains the liquid with which surface tension differs, and the container with which configurations, such as volume, differ according to this invention, it is not necessary to prepare the elastic porous body from which a void content and a configuration differ, and a liquid maintenance container can be manufactured using the elastic porous body of the same class.
[0111] Furthermore, by using the manufacture approach of this invention, while making the porous body loading process and the pressing operation complete, it was possible to have made a liquid impregnation process complete, compaction of the production process of a liquid maintenance container was attained, and its productivity improved substantially.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention makes it the technical problem for the amount of liquids which remains in the container which is not filled up with the porous body allotted in the liquid maintenance container which contains a liquid so that desired compression distribution may be made, and it cannot derive outside to increase.
[0010] Moreover, the space where the porous body in the container resulting from the internal configuration of a container is not allotted is covered with a liquid, and this invention makes it the technical problem for a liquid to leak to the container exterior.
[0011] Furthermore, this invention makes it the technical problem to prepare the elastic porous body from which a void content and a configuration differ, when using the container which contains the liquid with which surface tension differs, and the container with which configurations, such as volume, differ.

MEANS

[Means for Solving the Problem] This invention offers the manufacture approach of the liquid maintenance container characterized by having the pressing operation which compresses two or more elastic porous bodies, and the loading process which loads with a porous body into a container so that only other porous bodies may be adjoined in the center section in a container as above-mentioned The means for solving a technical problem in the manufacture approach of a liquid maintenance container of having the restoration section of an elastic porous body in a container.

[0013] Furthermore, the manufacture approach of the liquid maintenance container which solves the above-mentioned technical problem more certainly provides by considering as the manufacture approach of considering as the manufacture approach which a loading process and a pressing operation repeat successively after made the loading process of said elastic porous body into the process which loads with an elastic porous body into a constant-rate container and making a pressing operation into the process which compresses the elastic porous body after loading process termination, or performing said loading process after said pressing operation.

[0014] Moreover, the compression relaxation process of an elastic porous body is established between the pressing operation which compresses two or more elastic porous bodies, and a loading process, and the manufacture approach of a liquid maintenance container of having a liquid supply process to said porous body at this compression relaxation process is offered.

[0015] And in the manufacture approach of a liquid maintenance container of having an elastic porous body in a container, it has the loading process which loads with said elastic porous body into a constant-rate container, and the pressing operation which compresses said elastic porous body, and the manufacture approach of the liquid maintenance container characterized by repeating said loading process and said pressing operation successively is offered.

[0016] In addition, in the manufacturing installation of a liquid maintenance container which has the restoration section of an elastic porous body in a container, the manufacturing installation of the liquid maintenance container characterized by having the reservoir section which stores said two or more elastic porous bodies, a compression means to compress said two or more elastic porous bodies, and the charger stage which loads with said porous body into a container so that only other porous bodies may be adjoined in the center section in a container is offered.

OPERATION

[Function] By adopting the above-mentioned approach, it is possible to make the compressibility of the elastic porous body inside a liquid maintenance container into the distribution condition which was adapted in activity eye over the whole liquid maintenance container.

[0018] And the container of the configuration of arbitration can be filled up with an elastic porous body.

[0019] Moreover, impregnation of a liquid can be made to complete when compression loading of the elastic porous body inside a liquid maintenance container is completed.

EXAMPLE

[Example] The container filled up with a porous body is shown in drawing 1 and drawing 2 using the manufacture approach of the liquid maintenance container of this invention. It is liquid derivation opening for deriving to the exterior the liquid with which 10 was contained by the liquid maintenance container and 8 was contained inside the liquid maintenance container in drawing 1 .

[0021] 10a is a liquid derivative which promotes that the liquid stored in the interior of a liquid maintenance container is drawn outside here, and 9 is a liquid derivative maintenance wall for holding liquid derivative 10a. Moreover, drawing 2 looks at the maintenance container in drawing 1 from a pars-basilaris-ossis-occipitalis side (the direction of arrow-head A).

[0022] In addition, the container with which this invention is adapted is not restricted to the gestalt shown in drawing 1 and drawing 2 , and as you may be the configuration where the filter was prepared at the head of the interior of a liquid container of the liquid derivative maintenance wall in drawing 1 , without using liquid induction member 10a and it was shown in drawing 2 , it does not have the need that a cross-section configuration is a rectangular parallelepiped, either.

[0023] The liquid maintenance container manufactured as an ink tank which uses this invention for the liquid maintenance container shown in drawing 1 and drawing 2 , for example, is used for an ink jet recording device is shown in drawing 3 . In drawing 3 , 11 is a lid which plugs up opening for porous body insertion of a liquid maintenance container, and 11a is atmospheric-air free passage opening which makes the interior of a liquid maintenance container established in the lid 11, and the exterior open for free passage.

[0024] And 50 is a macromolecule elastic porous body and is small fabricated as compared with the content volume of a liquid maintenance container. The porous body which two or more these porous bodies 50 were formed in the liquid maintenance container, and the porous body allotted to the center section in a container etc. adjoined only other porous bodies, and was allotted near the wall of a liquid maintenance container adjoins the both sides of other porous bodies and the wall of said liquid maintenance container.

[0025] If the magnitude and the configuration of this porous body 50 can be loaded with more than one among all the walls inside an ink container, they are good. Therefore, the magnitude or the configurations of two or more porous bodies of all instead of what is restricted to a rectangular parallelepiped, a globular form, etc. again do not need to be equal. Hereafter, a porous body 50 is called a flake porous body in this invention.

[0026] As mentioned above, in this invention, not a porous body but the flake porous body of the simple substance which has the magnitude of a container which occupies the whole mostly are used as a porous body for holding a liquid, but when loaded into a liquid maintenance container, it is loaded with this flake porous body so that two or more porous bodies may be in the condition of it having been compressed mutually and having adjoined.

[0027] In addition, it is more desirable to arrange the magnitude of the flake porous body 50 and a configuration to some extent, when there are needs, such as to perform supply which equipped for example, the ink jet recording apparatus etc. with the liquid maintenance container using this invention, and was certainly stabilized in the ink jet recording apparatus in ink.

[0028] This invention hereafter used in order to manufacture an above-mentioned liquid

maintenance container is explained to a detail based on a drawing. Magnitude of a flake porous body was used as 5mm angle in each example.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The outline sectional view having shown the liquid maintenance container used for this invention
[Drawing 2] The outline sectional view having shown the liquid maintenance container used for this invention
[Drawing 3] The outline sectional view of a liquid maintenance container which manufactured using this invention
[Drawing 4] The outline sectional view of the restoration equipment of the 1st example of the manufacture approach of the liquid maintenance container of this invention
[Drawing 5] The outline sectional view of the restoration equipment of the 1st example of the manufacture approach of the liquid maintenance container of this invention
[Drawing 6] The outline sectional view of the restoration equipment of the 1st example of the manufacture approach of the liquid maintenance container of this invention
[Drawing 7] The outline sectional view of the restoration equipment of the 2nd example of the manufacture approach of the liquid maintenance container of this invention
[Drawing 8] The schematic diagram explaining a porous body charger's order of the 2nd example in this invention
[Drawing 9] The schematic diagram explaining a porous body charger's order of the 2nd example in this invention
[Drawing 10] The outline sectional view of the restoration equipment of the 3rd example of the manufacture approach of the macromolecule liquid maintenance container of this invention
[Drawing 11] The outline sectional view of the restoration equipment of the 4th example of the manufacture approach of the macromolecule liquid maintenance container of this invention
[Drawing 12] The outline sectional view of the restoration equipment of the 5th example of the manufacture approach of the macromolecule liquid maintenance container of this invention
[Drawing 13] The outline sectional view of the restoration equipment of the 6th example of the manufacture approach of the macromolecule liquid maintenance container of this invention
[Drawing 14] The schematic diagram having shown the liquid maintenance container which held the conventional macromolecule elastic porous body
[Description of Notations]
1 Hopper
2 Rotary Valve
3 Piping
4 Air Inlet
5, 5a, 5b Supply nozzle
8 Liquid Derivation Opening
9 Liquid Derivative Maintenance Wall
10 Body of Liquid Maintenance Container
10a Liquid derivative

10b Space
11 Lid
11a Atmospheric-air free passage opening
12 Macromolecule Elastic Porous Body
13 16 Motor
13a, 16a Driving shaft
14 14b Delivery screw
15 15b Compression screw
20 Check Valve
21 Liquid
22 Liquid Piping
23 Filter
31 Liquid Hopper
32 Filter
33 Effluent Nozzle
41 Tube
42 Porous Body Presser Foot (Adjuster)
50 Flake Porous Body
50b The compressed flake porous body
50c Liquid impregnation flake porous body
101 Wearing Guide
102a, 102b Movable plate
103ax(es), 103bx, 103ay, 103by Movable wall (loading guide)
104a, 104b Movable lid
105 Piston
1031, 1032, 1035, 1036 Fixed wall
1033, 1034, 1037, 1038 Movable wall